

**Bumper  
Xmas issue**

CANADA \$4.50 USA \$3.25 Vol 2 No 8 UK £1.25

# COMMODORE

# COMPUTING INTERNATIONAL

# The independent Commodore magazine

# Music micro, please! Economical keyboard connections

# Interfacing – 64/VIC/PET with BBC Micro

# Hard disks: A soft option?

commodore  
RAINE Fr 18.5 GERM

FRANCE Fr 18.5 GERMANY 6DM



A barcode graphic with vertical lines of varying widths. To the left of the barcode, the number '0' is printed. To the right, the number '8' is printed. Diagonally across the barcode, the number '5669871677' is printed.

20151

# FROM AUDIO-COMPUTERS (SOLIDISK) THIS MONTH:

## NEW LOW PRICES ON VIC-20 HARDWARE ADD-ONS AND THE INTRODUCTION OF NEW SOFTWARE CARTRIDGES

If you have already bought a memory cartridge for your VIC-20 computer, we still have many exciting items to offer, under the heading 'FURTHER EXPANSION'. They are perfectly compatible with all Commodore and many other manufacturers products.

### NEW LOW PRICE ON 16K MEMORY CARTRIDGE:

Any program sold for the VIC-20 with 8k or 16k extra memory will run with the SRC16. The NEW PRICE of the SRC16 is now only £27.00, including VAT and manual.

It is important to know what else you can do with the SRC16 other than running big programs.

1) The SRC16 can be upgraded to 32k bytes of RAM at a fraction of the cost of a 16k cartridge. This upgrade costs only £11.00.

2) The SRC16 has an X-ROM SOCKET. Games or utilities ROMs such as SCREEN ROM or SOUND ROM can be bought separately and used in this socket. Each software ROM costs around £5-10.00.

3) The SRC16 can have an EXPANSION SLOT built in. This important fact should be noted, since many VIC users experience fitting problems and extra expense when adding a Programmer's AID toolkit cartridge or the Machine Code Monitor Cartridge to their system. With many other low cost 16k memory cartridges, the user will have to buy a multi slot motherboard just to accommodate any extra cartridges. This feature alone could save you as much as £20! The SLOT is the exact reproduction of the expansion port into which the SRC16 is inserted and will cost you only £3.00. Right now you can choose any of the extra features to be built into your SRC16 cartridge. Simply tick the option boxes shown.



### FURTHER EXPANSION TO THE VIC-20 COMPUTER:

#### 1) 3 SLOT MOTHERBOARD:

for those for whom it's too late to buy a SRC16 cartridge or who want more than just memory. The 3 Slot MOTHERBOARD is not without special interest:

a) A Memory Select System allows the user to add the memory capacity of 2 RAM cartridges — for example, an SRC16 and a Commodore VIC-1111 can be used together to provide 32k bytes.

b) An optional 8k Memory System, very flexible, that will give 11775 bytes free or 6655 bytes free in the Low Res area or occasionally 8k bytes at \$A000 to \$BFFF for developing your own Autostart program can be added. Furthermore, if you then add your SRC16, you will get 28159 bytes free for your VIC 20!

c) 2 EPROM SOCKETS: this feature is very much appreciated by most users and has been added only very recently. You can use either 4k EPROMs (2732) or 8k EPROMs (2764) in these sockets. Each EPROM can be activated individually exactly as if you had 2 extra cartridges in your system!

#### 2) THE VIC EPROM PROGRAMMER: (uses 2764 Eproms)

We would need a whole page to describe this exciting peripheral for your VIC-20. Briefly, the cartridge works a little like a Disk. You can insert the VIC EPROM PROGRAMMER (VEP for short) into the SLOT and activate it with:

SYS 39000

On the VEP, you will find 4 EPROM sockets. Now type in 'C' to display the catalog. It will show what is in every EPROM. It could be like this:

1. BIGBASIC	Simply enter 'R.1' to read the first program. You will instantly see: *READING BIGBASIC
2. UTILITY	*READING OK
3. AUTOSTART GAME	READY
4. BLANK EPROM	

Now you can list it, print it, run it etc...

The VEP does the loading of a 16k program in about 3 seconds with no loading error unless you have a bad RAM; it will then list out all the dead or missing bytes!

To put a program into EPROM, load it from tape or disk, activate the VEP and enter 'W PROGRAM-NAME' — very simple to do. Other useful commands provided by the VEP include Hex Memory Display, Memory Change, Memory Fill, Memory Transfer, Save a Block of Memory, Load Tape, Cold Start, Centronics Printer Drivers etc...

You can put Basic, utility or autostart games onto Eprom in a similar way. The VEP will work out where your program is stored and will scan the EPROMs to find enough space to put it.

You can also use it as a self contained Eprom programmer to program, verify and copy Eproms.

Utility and Autostart EPROMs made with the VEP can be used on our Motherboard or on our BLANK SOFTWARE CARTRIDGES and used as any software cartridges.

We supply a small manual together with the VEP showing how you can write an Autostart program, in Basic and in machine code. We will also supply you with a free Blank EPROM and a free Blank Software Cartridge to get you started.

A word of warning: we have developed this equipment to help users in materialising sellable software (we are very keen to buy) and will disclaim any illegal use of it.

#### SOFTWARE CARTRIDGES

(insert directly into back of VIC, into Motherboard or SRC slot).

1) SCREEN CARTRIDGE: Sets the screen size within limits as small or large as you like. You can for example set the screen to 40 lines x 80 columns and a 'window' of 28 lines x 30 columns, write a letter or draw a colourful playing board and move your window with control keys or joystick. As you are typing in, the window will move along to accommodate. Basic programs can be typed in, listed and run even in 80 column format. Price £10.00.

2) SOUND CARTRIDGE: transforms your VIC into an electric organ. You can play music with the keyboard, add a second voice when it plays the 1st, a 3rd when it plays back the 1st and 2nd etc, define ENVELOPE to create effects like wailing police siren, play music within basic program without slowing the speed of Basic. In short, the sound Rom makes the VIC as tuneful as the BBC micro or the ATARI. Price: £10.00

These 2 cartridges are also available in chip form. You can use the chips in the Motherboard or in the X-ROM socket of your SRC16. Price: £8.00 for either of the 2.

3) MORE CARTRIDGES will be released. We would like to market your programs in cartridge form. Alternatively, we can supply blank cartridges at very competitive prices for commercial use. We are just a phone call away so if you have a good idea, why not give us a ring?

SUMMARY	PRICE/U INCL. VAT
SRC16 .....	£27.00
<b>OPTIONAL EXTRAS FOR THE SRC16:*</b>	
UPGRADE TO 32K .....	£11.00
EXPANSION SLOT: .....	£3.00
<b>FURTHER EXPANSION:</b>	
3 SLOT MOTHERBOARD: .....	£19.95
OPTIONAL EXTRA 8K FOR MOTHERBD*	£16.00
VIC EPROM PROGRAMMER (+ free gift) .....	£39.00
EXTRA 2764 BLANK EPROM: .....	£6.00
BLANK SOFTWARE CARTRIDGE: .....	£3.00
<b>SOFTWARE CARTRIDGES:</b>	
SCREEN CARTRIDGE: .....	£10.00
SCREEN ROM ONLY: .....	£8.00
SOUND EFFECT CARTRIDGE: .....	£10.00
SOUND EFFECT ROM only: .....	£8.00
Post and packing: .....	£1.00
<b>TOTAL:</b>	

#### Official UK dealers:

SUMLOCK, Manchester, Norman DAVIS, Mill Hill, GODFREY'S, Basildon, CURRY'S MICROSYSTEM chain store.

#### Official European distributors:

Belux: ECD, Delft Tel 015 134429.

France: RUN informatique sarl, Paris Tel (01) 581 5144.

Germany: VOBIS Data computer GMBH, Aachen Tel (0241) 50 00 81.

SCHAFFER, Roetgen Tel (0240) 88 319.

Italy: SOLIDISK Italia, Inglesi (CA), Tel 0781 22529.

Portugal: LANDREY Engineering, Lisboa Tel 681243.

Sweden and Norway: DIGILOG, Goteborg Tel 031 20 29 00.

Thank you for the interest shown. Marketing Manager: H. PERRY

\*I enclose a cheque/postal order payable to SOLIDISK LTD for £:

\*Please charge my Access/Barclay credit card account No:

(\*Please delete/complete as applicable)

Signature

Name: Mr/Mrs/Miss: .....

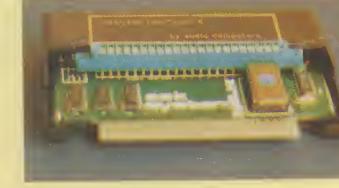
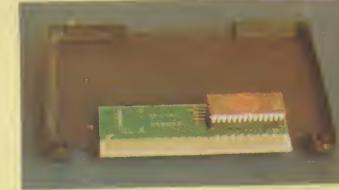
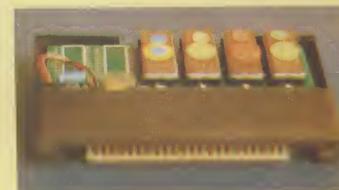
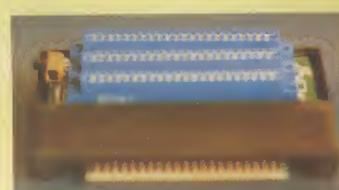
Address: .....

Please note: optional extras cannot be purchased alone. Also, if you wish to purchase them at a later date, SRCs and Motherboards must be returned together with the appropriate payment + £1 P+P. We regret we cannot accept orders of less than £10.00. All prices include VAT at 15%. Europe: deduct VAT, add £3.

TO: SOLIDISK TECHNOLOGY LIMITED  
(T/A AUDIO COMPUTERS)  
87 BOURNEMOUTH PARK ROAD  
SOUTHEND ON SEA  
ESSEX SS2 5JJ UK

OUR TELEPHONE NUMBER:  
CREDIT CARD SALES/  
DEALER ENQUIRIES:  
0702 618144

ENQUIRIES:  
0702 613081



# COMMODORE

## COVER STORY

## COMPUTING INTERNATIONAL

DECEMBER 1983



An exciting project for all 64 owners. It cost us around £40 and lots of time to produce this system which makes a mini synthesiser out of the 64.

Published by Nick Hampshire Publications, 167-169 Great Portland Street, London W1.

**Managing Editor** ..... Nick Hampshire

**Consultant Editor** ..... Peter Arnott-Job

**Features Editor** ..... Martin Bush

**Staff writer** ..... Sally Wood

**Technical Editor** ..... Richard Franklin

**Programmer** ..... Carl Graham

**Advertisement Manager** Peter Chandler

**Sales Executive** ..... Susan Moisey

**Telephone:**

**Editorial** ..... 01-636 6531

**Advertising** ..... 01-636 6408

**Subscriptions** ..... 01-636 6354

Distribution by Magnum Distribution Ltd, Chronicle House, 72-78 Fleet Street, London EC4Y 1HY.

Printed by Ambassador Press, Radlett Road, Colney Street, Radlett, St Albans, Herts AL2 2EG.

© Nick Hampshire Publications 1983.

ISSN 0265-475X

Commodore Computing International - an independent magazine for Commodore computer users - is not connected in any way with Commodore Business Machines U.K. Ltd. It is published 12 times per year by Nick Hampshire Publications Ltd. The Publishers do not accept liability for any incorrect statements or errors contained in material from independent sources or authors which may be reproduced from time to time.

### NEWS

Keep up to date with what's happening in the computer world

### PRODUCT NEWS

The latest hardware and software for Commodore personal computers

### PUZZLES

Give those fingers a rest from the keyboard with a few mind bending puzzles

### MUSIC

Turn your 64 into a real musical instrument with a piano keyboard

### CONNECTIONS

Computer control in the home

### CAROLS

We could hardly let Christmas go by without a festive tune or two

### SOFTWARE REVIEWS

35

We test the latest software

### HARDWARE REVIEWS

39

A ready made music system with a piano style keyboard

### GAMES

43

We test recent arcade and adventure games for the VIC and the 64

### CHRISTMAS GIFTS

49

A special bumper section with all sorts of gift ideas for all owners of Commodore machines

### INTERFACING

82

How to connect a Commodore computer to a BBC Micro

### HINTS AND TIPS

88

Four pages filled with useful routines and hints

### INSIDE BASIC

94

Nick Hampshire takes another look at Basic

### BASIC PROGRAMMING

96

Eight pages of useful and entertaining programs

### BUSINESS PRODUCTS

104

To start our business section a look at the latest products

### APPLICATIONS

106

How Commodore computers help to spread the news

### BUSINESS SOFTWARE

112

An in-depth look at the latest software designed for business

### BUSINESS HARDWARE

116

We review the latest products for use in business

### PERIPHERALS

119

A survey of hard disks

## Show expects boom crowds

At the 1984 Which Computer Show (which is to be held at the National Exhibition Centre in Birmingham, 17-20 January) there are to be more than 100 new product launches and the show itself is to be expanded by 25%, most of this expansion being accounted for by the fact that there will be a much heavier representation of American and Japanese companies.

There will also be a new software and services centre providing supplier and product information via a Viewdata information system. An electronic directory will provide an index of 600 classifications covering the whole show and the Recognition of Information Technology Achievement awards (RITA) will be presented on the final day of the show.

A report compiled after the 1983 show indicated that 8 million was spent as a direct result of the show within the four months after the show.

### NEXT ISSUE

The December issue of *Commodore Computing International* has something for everyone. There's a digitiser project—a digitiser does the reverse of a plotter. Instead of the computer telling a pen where to go, the pen tells the computer where it is.

We will also be taking the lid off one of the Commodore machines to tell you exactly what goes on inside. And for all those machine code buffs we will be publishing a very useful machine code routine which takes all those peculiar characters out of listings and explains them in (relatively) plain English!

**TEMPORARY PRICE INCREASE  
FOR THIS SPECIAL BUMPER  
ISSUE ONLY BACK TO THE  
NORMAL PRICE NEXT MONTH**

# Shake out in computer market continues

The computer industry is going through a traumatic period with some smaller companies encountering serious financial problems and Texas Instruments announcement that they are pulling out of the personal computer market.

The announcement from TI followed a massive loss in excess of \$300 million in that market. The biggest shock waves have been felt in those businesses supplying TI and owners of TI machines.

Investors are now being more realistic about new technology stock—TI's rating rose after their announcement! This is in marked contrast to the fall in price Commodore of shares after their announcement of a profit.

Smaller companies are also being hit. Osborne, for instance, have filed for protection under US bankruptcy laws. And Dragon have their own problems.

But the UK arm of Osborne believe they have a profitable future. Michael Healey, head of Osborne's UK distributorship, insists that there is still a market in the UK for Osborne's micro.

Commentators believe that rationalisation is taking place within the computer industry.

The distributors in the UK have approached the US authorities with a plan to buy out the British end of the company.

A lot of the concern within the industry is reflected by the number of companies that have gone public on the stock market. Following in the recent footsteps of Atlantic Computers, Telematrix and Acorn, the British software company Logica has announced such plans.

Acorn have been placed on the Unlisted Securities Market with a price tag of about 100 million, this only a few days after they announced plans to go into the American market

and to increase production of the Electron at its factory in Wales.

The effects of the shake-out in the computer manufacturing industry will have far-reaching consequences. As the market settles down it is expected that a few machines will become dominant.

Before this even happens, producers of software and hardware will be looking carefully at their own marketing strategy. It is likely that as the public becomes more selective in their buying of computers—perhaps preferring to buy a slightly more expensive machine from an established manufacturer who they know will survive—suppliers and manufacturers will also become selective.

The amount of hardware and software is therefore likely to decrease for machines whose sales are unlikely to reach a high level. Instead efforts will be concentrated on the top selling machines.



## Computers at the checkout

Readers in Canada and the US will not be as puzzled as other readers by that box of lines of varying thicknesses on the front of this issue of *Commodore Computing International*. And UK readers who have been to a supermarket within the last 18 months or who have bought imported magazines will have seen it before.

It looks complicated but it's only a number. It's in a form which can be easily fed into a computer by way of a light pen. The lines and spaces represent numbers—just as in programming the spaces are as important as the lines because they communicate just as much

information.

The number conveys all the relevant information about the product, from date of manufacture and price to size or weight and what it actually is. (Incidentally, the bar code shown here is for a packet of dehydrated mashed potato!)

Retailers in the US use the bar code much more than UK retailers. A light pen used at the checkout can feed information back to a computer which will automatically deduct each item from stock and add the price of the product to the revenue for the day.

If stocks of a product drop too low it can even automati-

cally order extra supplies. Supporters of bar codes or article numbering foresee a day when suppliers are directly linked to retailers and no manual ordering is done at all. Others foresee a day when we won't even have to leave our homes to shop.

*Commodore Computing International* has introduced the bar code because sales of the magazine in North America are more important than the threats of our art director who reckons it spoils our front cover. He's big and very strong but you should see our North American sales!

## Joyous joystick

"Remarkable? Yes. Impossible? Not now! Make a game out of keeping fit and suddenly it's easy as well as a pleasure. How? With the Aerobics Joystick from Suncom."

That's how the Press Release starts and we were so impressed we felt we just had to tell everyone about it. With an adaptor the Aerobics Joystick is compatible with the VIC-20 and the CBM-64.

This is what you do: The joystick connects to your keep fit cycle. The faster you pedal, the faster the game goes. As you cycle along (not quite 'along', perhaps because you stay in one place) you can also play a number of games.

There must be other similar applications. The Dentist Joystick, for instance. Play the game while the dentist drills – the greater the pain the faster the game. And for real games addicts the 'Love Joystick' – the faster you go ...!

As the final paragraph from the Press Release says: "the Aerobics Joystick takes away the boredom from biking, the guilt from idle gaming, and puts the fun into fitness." (PS It costs £34.95).

## User group

The '38911 Bytes Free User Group' is a new group that has just been announced by the founder, Paul Montague.

The group, which is exclusively for existing users and prospective users of the Commodore 64, operates in the South West of England. For membership details contact Paul Montague, 12 Laxton Close, Taunton, Somerset TA1 2UL.

Commodore looks set to become the world's leading manufacturer of home computers if pre-Christmas and New Year sales hold up.

This is good news for all Commodore owners because it means that there will continue to be a plentiful supply of compatible hardware and software.

US research company Future Computing predict revenues of \$500 million in 1983 for Commodore. And in the UK both the VIC-20 and the CBM-64 have been selling well in the run up to Christmas.

But the computer market is still highly volatile and nobody is willing to predict what the position will be in the Spring of 1984. Commodore have been

very aggressive in their pricing policy during 1983 which has upset some retailers, particularly in North America. They are concerned that reduced prices means reduced margins.

There are rumours that Commodore will continue to pursue an aggressive pricing policy and that this may mean further price changes. They have been fuelled by suggestions that a new range of Commodore machines may be on the way (Commodore Computing International, Vol 2 No 7).

But although the VIC is old in computer terms the 64 seems to have plenty of life left. Orders from retailers for both machines for the Christmas

period have been substantial though sales of the VIC have stabilised in the US.

At Commodore's UK plant in Slough extra staff have been employed to ensure the despatch of 10,000 VIC's a day to retailers. The price of the VIC, between £130 and £140 for the complete starter pack including cassette unit and software, makes it an attractive gift buy.

By the beginning of the third quarter of 1983 the VIC had sold 2,000,000 worldwide with UK sales of 270,000 – more than enough to generate a plentiful supply of hardware and software.

The VIC has performed well for Commodore and there is every indication that the 64 is doing just as well.

## IBM's Peanut creates dilemma

IBM recently announced the launch of two new personal business computers and left most of the computing world in a real dilemma. Almost everybody was expecting IBM to unveil the long awaited and much heralded Peanut personal home computer. Everybody is still waiting.

In their announcement, IBM claim that the 3270 Personal Computer – which forms part of IBM's popular computer terminal family – can display up to seven different documents and communicate with IBM mainframes at a price which greatly undercuts all of its competitors.

The release of IBM's business computers puts increased pressure on several personal

business computer manufacturers. In the States, several companies are looking to their laurels.

Tandy, Apple and Digital Equipment have all seen a drop in sales and share prices over the last few months. This in a market which is currently growing at an estimated rate of 50% per year.

IBM are expecting to take 30% of the business computer market and an indication of their success in being able to achieve this target is coming from the banks.

Most major banks are allowing corporate customers the chance to talk directly to their computers by using the IBM Personal Computer as office terminals.

## Galactic contest

Think of a number between 1 and 10,000. That's all you need to do to stand a chance of winning one of 20 CBM-64's or one of 100 joysticks that Galactic Software are offering in a Christmas competition.

Entry to the competition is open to anyone buying one of their products before Christmas Day. There's an entry form with which the bottom right corner of the cassette cover from a newly purchased Galactic game must be included.

Those who already own a 64 need not feel left out. Galactic will be offering alternative prizes of disk drives or printers to existing 64 owners who win.

Each entrant chooses a number between 1 and 10,000. Galactic's own computer (a 64?) will have already chosen 120 numbers within these parameters and the closest guesses win a prize.

# HMV range wide



*His Master's Voice, famous until now for selling records and, more recently, video software, are moving into the computer software market.*

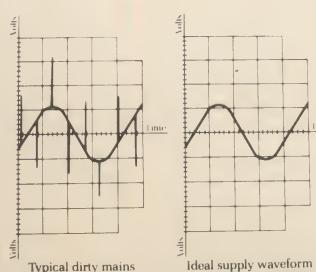
*The large store in London's Oxford Street, well known to Londoners and visitors to the UK, has recently introduced a range of software.*

*Their selection reflects a cautious attitude. They have chosen 70 or 80 games for a number of machines including the VIC-20. The aim of HMV is to carry the widest range of home entertainment products to be found anywhere in the UK.*

## Suppressing nasty surges



*The Power Cleaner plug cuts out power surges and spikes.*



B & R Electrical Products Limited have designed a plug that should eliminate energy spikes and surges on the mains. Such occurrences are quite frequent and potentially dangerous to computers and wordprocessors.

The product is called the PowerCleaner surge suppressor plug. This plug merely replaces the existing 13Amp mains plug. It is claimed that the PowerCleaner provides a reduction of up to 99% in equipment damage or disruption.

This special plug is built around sophisticated surge protection circuitry and surges are eliminated without interrupting the power supply to the equipment, cost is £8.65 pence plus VAT.

**Contact:** B & R Electrical Products Limited, Temple Fields, Harrow, Essex CM20 2BG. Telephone: 0279 34561

## Forth right language

C64-Forth from Performance Micro Products is a complete high level language and operating system designed to run on the Commodore 64. Forth programs can be written and debugged at least three times faster than Basic programs and will often run four to 10 times faster. C64-Forth also offers an integral macro assembler which allows free intermixing of Forth and assembly code.

ASCII error messages eliminate looking up an error code and the free format screen editor simplifies entering the source code. Forth screens are saved as data files allowing the intermixing of Forth object code and source screens on the same disk or

tape and access to Basic data files.

C64-Forth works with any Commodore tape drive, VIC 1540 or 1541 disk drive.

A high level extension to C64-Forth is C-64 Xtend which will not work on its own. This package provides floating points, logical functions, transcendental functions and string capabilities. The floating point ranges from 1E plus 38 to 2E-39.

Future products expected soon are C64-Graphix and C64-Debug.

**Contact:** Performance Micro Products, 770 Dedham Street - S2, Canton, Massachusetts, USA. Telephone: USA 617 828 1209

## New soft sell

Better known for their involvement in bookshops and distribution of paperbacks, Websters Group PLC is moving into the computer software area. The new division of the group is called Websters Software Limited and it is planned to build a base of 500 retail accounts on a nationwide basis.

Websters will be acting as wholesalers and distributors of software and, initially, the range of software (a total of nearly 400 titles) will be aimed at the personal home computer

market including the VIC and 64. Most of the software will be games, although there will also be some business and educational products.

Clive Digby-Jones of Websters Software Limited says that the company will be selling into retailers "who won't by any means be just computer shops. Instead of having to deal with dozens of different suppliers, the retailer will be able to obtain all the worthwhile titles for some 15 different types of computer from Websters Software."

## Sunshine's Grace

There is a new book that will be of interest to users of the Commodore 64. It comes from Sunshine Publications, is written by Mike Grace and is called *Commodore 64 Adventures* (£5.95). This is a guide to writing and playing adventures with the emphasis being placed on the creation, design and planning of the games as well as the programming techniques.

The book is divided into two sections. First of all there is a

simplified adventure framework that, claim the publishers, will work for any story and help you to understand how to create your own.

The second part will appeal to the person who buys the book just to play the game because it contains a complete adventure called *Nightmare Planet*. This game is complemented by the notes and anecdotes on the problems and pitfalls of adventure programming.

# Laser Strike

for the commodore 64



SCENE

challenge the asteroid field,  
maneuver the caves of ice,  
experience the thrill,  
play laser strike.

Laser strike, written in full machine language for the Commodore 64.

Commodore 64 is a registered trademark  
of Commodore Business Machines Inc.

Visa/MC/Check/Money Order accepted

In U.S.  
Cassette \$24.95  
Disk \$29.95  
Isis Hathor Digital Productions  
6184 Verdura Ave.  
Goleta, CA 93117  
(805) 964-6335  
Add \$2.00 postage and handling  
California residents add 6% sales tax

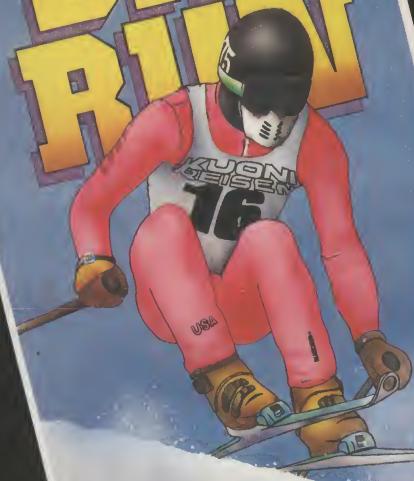
\* Ask about Laser strike posters



In U.K.  
Cassette £ 7.50 VAT included  
Disk £19.95 VAT included  
Isis Hathor U.K.  
Andrew Barrow  
Royden, Perkslane  
Prestwood, Gt. Missenden  
Bucks, England HP16 0JD  
02406-3224

Postage and packing  
is included

# SKI RUN



**SKI RUN**  
All the excitement and skill of the ski slopes with downhill, slalom and giant slalom. Put yourself to the test and record the fastest time! Nine levels of difficulty. High quality graphics and brilliant sound effects!!

# SPACE RAIDERS



**SPACE RAIDER**  
Engage in a furious intergalactic intelligence battle. As you try to blast and outwit the fast developing alien star ships. Incredible sound effects, smooth high resolution graphics in this top quality arcade action game.

# Boom Software

## It will blow your mind

### LOGGER MANIA

Can you dodge the traffic, jump your logs, slip the bears, and get home before sunset? A game with a difference written in all machine code with high quality graphics.

# LOGGER MANIA



**ANNIHILATOR II**  
Defend your planet against a mighty alien invasion. All machine code makes for fast and brilliant arcade action!

# ANNIHILATOR II



Post this coupon now to Boom Software  
2-4 Chichester Rents, Chancery Lane,  
London WC2A 1EG

Please send me the following:  
 £5.50 £5.50 £4.75  
 Ski Run      Logger Mania      Annihilator II  
 £5.50 £5.50 £4.75  
 Annihilator II (VIC 20)      Space Raider      Trek (VIC 20)  
 Total cheque/PO enclosed £ .....  
 ..... payable to 'Boom Software'

Name .....  
Address .....

commodore 64  
and VIC 20

# Commodore 64

## Mondatta

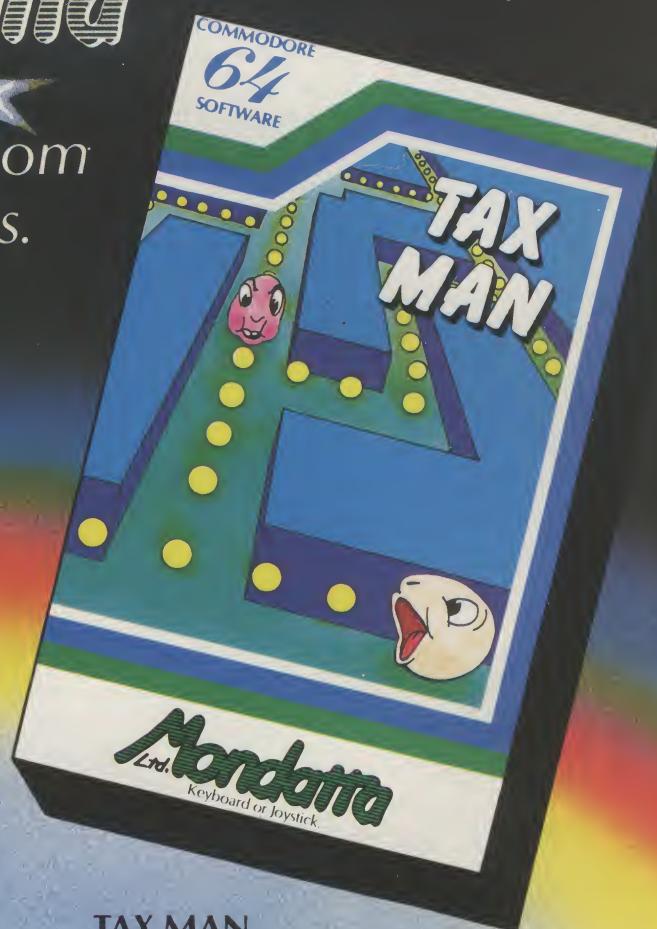
Software from  
the States.



### SUPER COPTOR

Fly Super Coptor in a Mission to Save your Country from destruction. Beware of "Air Missiles", "Radar Balloons", "Laser Screens". Control your "Super Coptor" with split second timing — are you up to it — 9 nerve popping, action packed levels of play.

ONLY £5.65.



### TAX MAN

You are on the run, gathering as much money as possible while being pursued by Taxmen with tax bills in their hands. Ready to pounce on you and make you bankrupt. Can you outsmart them or will they ambush you by hiding in the background.

6 exciting "Arcade Action" levels of play. A completely new version of this "nerve popping" game.

ONLY £5.65.

### DO YOU WANT A SHARE OF THE ACTION - £55,000

Mondatta will pay up to £55,000 for good quality games software. Send details to the Software Development Manager at the nearest address below.

#### POST COUPON NOW

Please rush me \_\_\_\_\_ Tax Man at £5.65 each

Post to: Mondatta Ltd, 38 Cuddington Avenue,

Super Coptor at £5.65 each

Worcester Park, Surrey KT4 7DB, England.

+ 50p post & packing.

Tel: 01-3370806.

I enclose Cheque/P.O. for £  
(Make payable to Mondatta)

Mondatta Ltd., Darwen House,

200 Rathfarnham Road, Dublin 14, Ireland.

Tel: 01-963250.

Mondatta Ltd., 888 Seventh Avenue,

New York, N.Y. 10106, U.S.A.

**DEALER  
INQUIRIES  
WELCOME.**

Name \_\_\_\_\_

Address \_\_\_\_\_

**FREE  
ENTRY TO A  
DRAW  
FOR C.B.M. 64  
DISK DRIVE  
& PRINTER.**

**The Lightening Oric Assembler. £9.90\***

There are other assembler/editors available for the ORIC but none combine the same features and ease of use that we have obtained with this comprehensive utility program for the ORIC 48K. The manual which accompanies the assembler gives a brief insight into machine code and the use of assemblers to enable anyone to write in assembly language after just a little study. Full specifications of the assembler cannot be fitted into the small space available here and so they may be obtained from your local dealer or direct from Mr. Micro.

\*Includes comprehensive instructions booklet.

**Crazy Golf  
48K Spectrum**

Crazy golf is a new program for the 48K Spectrum you are required to clear the course avoiding and circumventing the many strange obstacles finally putting your ball in the hole. The par for each hole is displayed and a novel direction indicator combined with a force indicator enable you to send the golf ball in the direction you feel is the best one to clear the course. Crazy golf really is crazy but most of all it is fun and will be found to be very enjoyable by all members of the family.

For use with Joystick and keyboard.

**Bengo  
Vic 20**

An exciting program for the unexpanded Vic 20, which combines fast moving strategy and reflex skills. You must control Bengo the super Eskimo against the dreadful snow Yeti – Half blind and half witted the Yeti can smell a good Eskimo lunch – the only protection Bengo has is to hurl huge blocks of ice across the frozen waste at the Yeti.

– Don't get distracted – or you'll be personally responsible for the demise of an Eskimo!

For use with Joystick

**Dracula  
48K ORIC**

A superb adventure for the 48K ORIC. This adventure is written in the good old style! No silly graphics, no gratuitous drawings, no distractions from pure mental images of horrendous realism. This evocative text adventure of the old genre will have Oric owners shivering with anticipation and perhaps fear.

Dare you load DRACULA into your ORIC 48?!

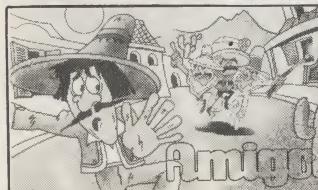
By keyboard.

£6.90



# No shocks – Plenty of surprises!

Mr. Micro means programs you can trust. Programs that are as exciting when you load them as they look at your dealer. Programs that come proven and refined. Programs that bring you the breathtaking excitement of arcade games with the special extra dimension of real mental challenges – all at the right price. Plus accessories and utilities which extend the value of your computer. Ask for Mr. Micro by name at your local dealer. Or order your games direct, post-free, from: Mr. Micro Ltd. 69 Partington Lane, Swinton, Manchester M27 3AL. Cheques should be made payable to Mr. Micro Limited. Ring our 24 hour hot-line for payment by Access or Visa on: 061-728 2282.



**Amigo** £6.90



**Digger** £6.90



**Humphrey** £6.90



**Mysterious Island** £9.90

Vic 20 8K or 16K expansion.

Hey Amigo you gotta run fast ah! The banditos they are a chasing you and they will a geta you ifa you do nota escapa OK. You musta runa rounda the blocka, when you run round de corners ofa de city the banditos they are frightened to go there and you score de points. Pity you have nota gota gun but a joystick can be fun.

For use with Joystick

Vic 20 8K or 16K expansion

Your remote viewer shows the path of the professors devilish digging apparatus. Using your computer linked remote control you must guide the digger beneath the earth to collect the rare micronite gems. Unfortunately the micronite is protected by the micronoids who will plague your machine in order to attempt to stop its progress. You may be able to kill the micronoids by skillfully manoeuvring your digger beneath a subterranean stalactite which will then fall killing any micronite in its path. This is a novel implementation of a popular arcade game. For use with Joystick

Vic 20 BBC Model B

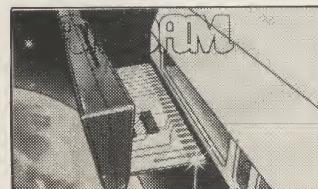
This new game for the BBC Model B or for the VIC 20 (8K or 16K expansion) and also for C64 involves some tricky decision taking. Object of game is to make Humphrey land on all the cubes thus changing their colour. Unfortunately Humphrey is being chased by a bouncing ATOMIC BOMB! You will soon learn that this deceptively simple game has tremendous addictive properties and quite a high degree of tactical skill.

For use with keyboard or Joystick

Vic 20 16K

Escape from prison in a hot air balloon – try to land it on Mysterious Island, then the fun really begins. • Booby Trapped Fields • Killer Bees • Hostile Natives • Hidden Clues • Force Fields • Capture the Nautilus • Full Graphic Display • Several Games lead to Exciting Climax • Separate Practice Program • Includes Blank Data Tape to store the game to play later.

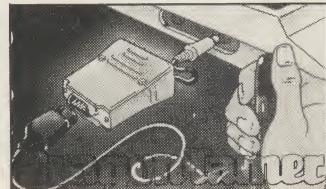
All successful adventures can claim a unique personalised award by sending Mr. Micro their final position at the end of the game – By Joystick or keyboard



**RAMDAM** £13.90  
Vic 20



**Punchy** £6.90  
Spectrum 484



**Dragon Tamer** £9.90  
Dragon 32



**Goldrush** £6.90  
Vic 20 3-5K

This accessory enables programs which would normally only work with 3K expansion to work with 8K or 16K expansion. RAMDAM saves having to buy a 3K pack if you already own an 8K or 16K. With RAMDAM and a Commodore 16K expansion all known tape games will run on your Vic 20. • Includes Memory Test Program • Free 6.5K game – MICROVADERS for use with Joysticks.

Punch has taken Judy for his evil purposes and locked her away. Judy has called upon the forces of goodness to escape, so with the help of our hero Bobby the policeman and you the purchaser of this fine program you must guide brave Bobby across the stage to rescue poor Judy. Leap the gaps. Jump over the dogs. Leap the alligator pit. Dodge the tomatoes. Rock the crib. Collect the sausages and finally rescue Judy. By Kempstone joystick or keyboard.

Allows Atari type and other digital joysticks to be used with the Dragon – giving better response and more control. For the first time your Dragon will be able to reflect your true skills. • Achieve higher games scores • Less Frustration.

Plus To ensure maximum value, Dragon Tamer includes two original games for use with digital joysticks.

This graphic adventure program was the first in the world to offer real gold for the successful adventurer. An idea which has been much copied but never equalled. • Fun • Educational • Challenging • Clues • Puzzles • Searches • Fast Reaction Game. For use with keyboard.

## Another Scouse house

Acme Software is a new Liverpool software house whose aim is to provide good original games or better implementations of the standard 'classics'.

Their attack on the software market has already started with the launch of three games, one of which is for the VIC 20. This game is called 'Bridgeman' and the idea behind this is to plug the gaps in the bridges as the construction firm boss carries out his progressive inspections.

Acme are also planning for the future with three more games expected to be announced shortly for the Commodore 64 and VIC. 'Melga-Vault' will run on the unexpanded VIC and 'Mowermania' will be running on the VIC with 8K expansion.

'Altair 4' is for the 64 and occupies 52K. A machine code program, this is an adventure game. No release dates have yet

been announced for the latter three games but Acme have promised that all their games will cost £5 each. The company are also willing to talk to other games programmers because they want to launch games as fast as they can.

**Contact:** Acme Software Limited, 49/51 The Albany, Old Hall Street, Liverpool, Merseyside L3 9EJ. Telephone: 051 236 8062.



Husband and wife team Alan and Soo Maton of Acme Software

## Educational pack from Chalksoft

Chalksoft have reworked all their tapes for the VIC 20, except the Super-Expander, so that they can be used with any expansion pack from 3K to 16K. Their current software for the VIC is made up of Inkosi, Invisible Man, Metrics, Pascal, Sequences and has recently been reinforced by Decimals, all of which are educational packages.

Inkosi is designed to stimulate thinking and group discussion because the idea is to

determine how you are going to manage your food supply, bearing in mind things like drought or population explosions may occur. The cost of this is £5.95.

In Invisible Man, a cartoon character is drawn and then hidden. There are three levels of difficulty and the man must be found before time is up. Clues to the whereabouts of the man are given by compass directions. The cost of this is £5.95.

## Plot a path to successful CAD

Pathplot is a piece of software that is split into two sections and, in conjunction with Pathtrace, can form part of a computer aided design system. In the geometry section of Pathplot, the programmer constructs the component profiles on screen which are then verified via display on the hi-res VDU.

These drawings can then be mirrored, scaled, rotated or translated as required. Once the component has been defined, the features can then be stored on disk for future recall during the other design stages.

The other section of Pathplot is called the offset section and it is in this section that the profiles are recalled from disk and the programmer specifies the tool diameter, direction or motion and whether internal or external offset is required. The

path is then calculated and stored on disk. Several of these paths can be made on each profile.

Once the geometry and offset files have been created, each file is processed through a machining section, and CNC program produced. Two plotting options are available, these being Superimposed plot and Dimensioned plot.

The first option allows a series of geometrical and offset files to be superimposed on the VDU to create a drawing which can be output via an XY plotter.

The latter option provides for one geometrical or offset file to be output complete with dimensions.

**Contact:** CAD, Pathtrace Limited, 5/9 Portsmouth Road, Cobham, Surrey KT11 1JG. Telephone: 093 26 5313.

## More on education

## Shark teeth

To accompany the Mator 5 1/4" Shark Hard Disk Unit, Mator Systems Limited have announced an integral tape back-up system. This tape comprises Ansi-standard, quarter inch, removable magnetic tape cartridges. The system is linked directly to the Shark and is controlled by an extension to the Shark DOS.

This new version provides 10 and 15 Mbyte storage and forms a complement to the other Shark units which extend up to 120 Mbytes in capacity.

The new unit offers either emulation of Commodore DOS or compatibility with CP/M based systems or its own file management system.

**Contact:** Mator Systems Limited, 134/140 Church Road, Hove, Sussex. Telephone: 0273 720451/2.



Why put up with second best when we can offer you a real choice of software for your Commodore 64? Here are some of the 250+ GAMES:

■ 3D Time Trek ANRG 5.75 ■ Arcadia 64 IMAG 5.50 ■ Attack of the Mutant Camels HES r25.00 LSFT 6.74 □ B1 Nuclear Bomber AHGC 11.50 □ Choplifter BBND 27.00 □ Combat Leader STSI warg d29.00 □ Early Games series for Children (5) CONT d21.00 21.00 ■ Falcon Patrol VIRG 6.95 ■ Final Flight MMG fsim d23.00 23.00 ■ Fort Apocalypse SYNQ d23.00 23.00 □ Glaxions OLA 7.75 ■ Grand Master ADGC chess 17.95 ■ Gridrunner HES r29.00 LSFT 5.00 □ Hexpert ANRG 7.75 ■ Hover Bovver LSFT 6.75 □ Hungary Horace MELH 5.75 □ Hustler BB 5.99 ■ Jump Man EPYX d27.50 27.50 □ Kaktus SSFT d10.00 8.00 □ Knights of the Desert STSI warg d29.00 29.00 □ Laser Zone LSFT 6.75 □ Mangrove SSFT d10.00 8.00 ■ Matrix 64 LSFT 6.75 □ Midway Campaign AHGC warg 11.50 □ Monopoly RAB 5.75 □ Moon Buggy ANRG 7.75 ■ Motor Mania ADGC 8.95 □ Munchman SOLA 7.95 □ Nukewar AHGC 11.50 □ Purple Turtles QUIK 7.95 ■ Quest of Merravid MART 7.75 □ Quintic Warrior QUIK 7.95 ■ Renaissance ADGC 8.95 ■ Scramble 64 INTM 6.75 □ Seafox BBND 29.00 ■ Shadowfax POST 6.75 ■ Silicon Warrior EPYX r29.00 ■ Siren City INTM 6.75 □ Snooker VISN 8.95 ■ Stix SSFT 8.50 □ Super Dogfight TERM 9.50 □ Tank Atak SSFT d10.50 8.50 □ The Fabulous Wanda... GAMA 7.95 □ Vortex Raider INTM 6.75 □ Yahtzee ANIK 7.95 ■ Zaxxon DSFT d27.00 27.00 ... plus STAK lightpen games: ■ Draughts, Go, Life, Lost in the Labyrinth, Othello, Seek & Destroy, Shuffle 5.75 (lightpen 28.00)

## software

The software lists show, in order: the product **name/producer/price prefix** (to indicate cartridge-<r> disk-<d> and no prefix for cassette. Producers are abbreviated (SSFT: Supersoft) for identification, and help to identify like-named products for price checking or ordering. The product types where differing slightly from others in the same grouping are: **ass(3)(u)**: three-pass assembler (+utilities) **comp**: compiler **dbu**: database (code)writer **intf**: interfacing **madv**: mystery adventure **mon(a)(u)**: monitor (+assembler) (+utilities) **pred**: programming tutorial **prog**: programming utility **sadv**: space adventure **stat**: statistics **txed**: texteditor **wpt**: wordprocessing + terminal software **wpu**: wordprocessing utility or link program.

PLEASE SPECIFY CHOICE OF DISK <d>  
CARTRIDGE <r> OR CASSETTE

### DATAFILES/DATABASES

■ CodeWriter DYNA dbu d85.00 □ Combined Database ANIK 12.95 □ Data Manager TIME d18.00 18.00 ■ Diary 64 KOBR r40.00 □ EasyFile CBM d75.00 □ FCOM CONT d35.00 □ Home Inventory CRTV 10.75 □ Infomast RAB dbu d90.00 □ Inquire-Pac IMPX d45.50 □ Magpie 64 ADGC dbu r95.00 □ MicroFiler 64 STAG d68.99 ■ Oracle 64 KOBR d100.00 □ Research Assistant TOTL d30.00 27.00 □ Simple File SISO d69.00 ■ Superbase 64 PREC dbu d97.00 ■ The Recipe Box ARM d15.00 □ TOTL Time Manager TOTL d30.00 27.00

### EDUCATIONAL

■ Bailiff SULI 9.95 □ Besieged SULI 9.95 □ Biology CBM 9.99 □ Chemistry CBM 9.99 □ English Language CBM 9.99 □ Face Maker SPNK r24.00 d25.00 □ Geography CBM 9.99 □ Get it Right SULI 9.95 □ Golden Apple SULI 9.95 □ Grammer Tree 1 SULI 10.95 □ Grammer Tree II SULI 10.95 □ Grammer Tree III SULI 10.95 □ Happy Tutor Typing Aid IMPX d14.00 14.00 □ Hey Diddle Diddle SPNK d21.50 □ History CBM 9.99 □ Just a Mo SULI 9.95 □ Kindercomp SPNK r21.00 d21.50 □ Masterbard I SULI 12.95 □ Mathematics I CBM 9.99 □ Mathematics II CBM 9.99 □ Memory Trainer EINS d42.00 □ Micro Addition HAYD d21.00 21.00 □ Micro Division HAYD d21.00 21.00 □ Micro Multiplication HAYD d21.00 21.00 □ Micro Subtraction HAYD d21.00 21.00 □ Patrick Moore: Astronomy CBM 9.99 □ Physics CBM 9.99 □ Quizagon CPNT d29.00 □ Rhymes & Riddles SPNK d21.00 □ Speed Reader II DUSN d47.50 □ Time Traveller SULI 9.95 □ Towering Inferno SULI 9.95 □ Turtle Trainer HES r28.00 □ Turtle Tutor HES r28.00 □ Typing Tutor + Word Invaders ACDM d18.00 15.50 □ Wordmaster SULI 9.95 □ Wordpower SULI 9.95

### ADVENTURE GAMES

■ Adventure Quest LEV9 9.50 □ Arrow of Death I C8 madv 9.75 □ Arrow of Death II C8 madv 9.75 □ Aztec Tomb AGTA 7.75 ■ Blade of Blackpool SRSS d27.50 □ Circus C8 madv 9.95 ■ Colossal Adventure LEV9 9.50 □ Conflict MART 14.75 □ Cosmic Capers SSFT d10.00 7.50 □ Curse of Ra EPYX 13.50 ■ Deadline INFO madv d34.50 ■ Dungeon Adventure LEV9 9.50 □ Escape from Pulsar 7 C8 madv 9.95 □ Feasibility Exit C8 madv 9.95 □ Fool's Gold ROMK 6.75 □ Galaxy Conflict MART 14.75 □ Gateway to Apshai EPYX r26.00 □ Goblin Towers SSFT d10.50 9.00 □ Golden Baton C8 madv 9.95 □ Gruds in Space SRSS d27.50 □ In Search of the Most Amazing Thing SPNK d21.50 □ Perseus & Adromeda C8 madv 9.95 □ Ring of Power QUIK 9.95 □ Snooper Troops: Case 1 SPNK madv d28.00 □ Snooper Troops: Case 2 SPNK madv d21.00 ■ Snowball LEV9 sadv 9.50 □ Starcross INFO sadv d29.00 □ Suspended d36.00 □ Sword of Fargoal EPYX d20.50 20.50 ■ Telengard AHGC 16.50 □ Temple of Apshai EPYX r20.00 d24.00 □ Ten Little Indians C8 madv 9.95 □ The Cracks of Fire SSFT d10.00 7.50 ■ The Hobbit MELH 14.50 □ The Island SPRB 9.75 □ The Streets of London SSFT d10.50 9.00 □ Time Machine C8 madv 9.95 □ Token of Ghali INTM 6.75 □ Tombs of Xeipos ROMK 6.75 □ Upper Reaches of Apshai EPYX d13.50 13.50 ■ Witness INFO madv d35.00 □ Wizard of Akryz C8 madv 9.95 ■ Zork I INFO d29.00 ■ Zork II INFO d29.00 ■ Zork III INFO d29.00

First listing available on request - this includes ACCOUNTING, BUSINESS, and other software not possible to include here. Let us provide that elusive software for you! Hardware and books also available at lowest prices. Send now for details! Or simply add your name on our mailing list. Please make cheques/PO's payable to The Six-Four Supplies Company; allow for clearing and post. Please add 50p (£1 Europe) P&P for orders less than £20. Telephone hot-line for credit card orders only: 0227 266289

# The Six-Four Supplies Company

P.O. Box 19, Whitstable, Kent CT5 1TJ

Incorporated by THE SOUTH-EAST SOFTWARE CENTRE

### WORDPROCESSING

■ Bank Street Writer BBND d50.00 □ Blitztext ECMP wpt d47.50 □ BusiWriter SSFT r53.00 d43.00 ■ EasyScript CBM d75.00 ■ EasySpell CBM wpu d50.00 □ Heswriter 64 HES r33.00 □ Instawriter INST r60.00 d27.50 27.50 ■ Mailpro 64 KOBR wpu d70.00 ■ PaperClip KOBR d90.00 □ Script64 RVTc d70.00 □ Simply Write SISO d46.00 38.00 ■ TOTL.Label TOTL wpu d19.00 16.00 □ TOTL.TEXT TOTL d34.00 31.00 ■ Vizawrite + VizaSpell VIZA d99.00 □ VizaSpell VIZA wpu d65.00 □ VizaWrite VIZA r75.00 d75.00 □ Wordcraft 40 ADGC r89.95 ■ Word Wizard BB txed 5.99 □ WordPro 3 Plus/64 WEGO d90.00

### UTILITIES (see also PROGRAMMING AIDS)

■ 1541 Backup SSFT dpe d12.50 10.50 □ 64 Sprite Editor STCK 5.00 □ Advertiser BB 5.99 ■ Arrow SSFT r43.00 ■ Backup + File Clone CLM copy 15.00 ■ Centronics Interface ADGC intf 7.95 □ Compactor SSFT d10.50 8.50 □ Delta Drawing SPNK r28.00 □ Forget-Me-Not TIME d18.00 18.00 □ Graphix 64 SSFT d12.50 10.50 □ Label Printer BB 5.99 ■ Poster Printer BB 5.99 □ Printsoft 64 + cable SSFT intf d30.00 30.00 □ Rel 64 KOBR intf r35.00 ■ Renumber SSFT d9.50 7.50 □ Sprite Maker 64 ENGS 6.75 □ Sprite/Graphics Editor CBM 5.99 □ Superfont 4.0 ENGS 6.75 □ Supersort 64 SSFT d25.00 23.50 □ Tagsort 64 SSFT d12.50 10.50 □ Tape Merge/Append SSFT d9.50 7.50 □ The Advertiser BB 5.99 ■ Vinctree SSFT r53.00

### PROGRAMMING AIDS (see also UTILITIES)

■ 6502 Professional System HES prog 21.00 □ Assembler INTM ass 6.75 □ Assembler Development CBM prog d24.95 □ Assembler Tutor CBM pred d29.92 29.95 □ C64 BASIC Tutor IMPX pred d13.75 □ C64 Tour IMPX pred d8.00 □ DTL-BASIC Compiler DATA comp 35.00 □ Gortek CBM pred 12.99 □ Hesmon 64 HES mona r29.00 □ Intro Basic I, II CBM pred d14.95 14.95 □ Jigsaw NOVA ass d7.95 9.50 □ Macrofire ECMP ass d47.50 ■ Mikro Assembler SSFT ass3 r53.00 □ Monitor ADGC monu r29.95 □ MC Soft 64 CHIP ass 7.25 ■ Pal 64 KOBR assu d72.00 □ PetSpeed 64 CBM comp d50.00 □ Power 64 KOBR d72.00 □ Programmer's Utilities CBM d14.99 □ Programmer's Guide KOAL d10.50 □ Simons Basic CBM prog r50.00 □ Turtle Graphics II HES r43.00 □ UltraBASIC 64 ADAM d24.95 22.95 □ Zoom SSFT monu d12.50 10.50

### PERSONAL FINANCE & SPREADSHEETS/STATISTICS

■ AccountPAC IMPX d22.50 22.50 □ Bank Manager 64 CHIP d9.50 7.25 □ Check Ease T&FS d25.00 21.50 □ Decision Maker ATC 10.75 □ Electronic Checkbook TIME d18.00 18.00 □ Accountant CONT d52.50 □ Home Manager HES d35.00 □ Household Finance CRTV 21.00 □ Money Manager CBM 9.99 □ Money Manager TIME 18.00 □ Time Money Manager HES d49.00 □ Abracalc ABCD d27.50 25.00 □ BusiCalc 2 SSFT d79.00 77.00 □ BusiCalc SSFT d45.00 43.00 □ CalcResult KOBR d11.00 □ Easy CalcResult KOBR 72.00 □ EasyCalc CBM d75.00 □ Future Finance CBM d75.00 □ Omnicalc HES d70.00 ■ PractiCalc 64 CSA d44.50 39.95 □ Stat 64 KOBR stat r35.00

## Shorter circuiting

Bicc-Vero Electronics have produced a wiring kit for all those people who like to wire up circuitry.

This kit comprises of Speedwire terminals which are mounted on a circuit board to provide component sockets on one side of the board and insulation displacement terminals on the other. A special pen called the Speedwire pen pushes an insulated solid conductor wire between the tines of the Speedwire terminal.

The component socket of the Speedwire terminal provides a four jaw contact positioned to wipe on all the four faces of the IC lead. This kit contains one populated eurocard, one eurocard design

## Upgrade 8032 to an 8096

SM Software, the creators of the Commodore LOS-96 Operating System, have developed an expansion for the 8032 and the 8032-SK. The expansion board, which was actually developed in West Germany, is 64K and enables the user to upgrade the 8032 to an 8096 whilst retaining full compatibility with all 8096 software.

This expansion board does not obstruct the ROM sockets on the 8032 and is very easy to install as it does not require any modification to the motherboard. The integrated circuits are of the plug-in type and there are facilities for further expansion.

To the end-user one of these boards will cost £300. This expansion board carried a guarantee for one year.

**Contact:** SM Software UK, Raglan House, 56 Long Street, Dursley, Gloucestershire, England, telephone: 0453 46065.

layout sheet, one wiring pen with a spool of wire and one pair of Speedwire cutters.

Also from the same firm comes a DIY kit which enables you to build your own casing in which to house your circuitry.

This is called the Total Access Case and it has been designed to cover all applications that require a stylish top case. The total accessibility is achieved by unscrewing the four screws in the side panels. Accessories to the kit include a chassis plate, mounting kit and a fan.

**Contact:** Bicc-Vero Electronics, Parr, St. Helens, Merseyside WA9 1PR, telephone 0744 24000.

## Generate programs

Codewriter is a program generator for the 64 and 8000 series which allows you to create your own software. Produced by Dynotech Microsoft, the only skill you need besides programming is typing, because all you have to do is type in the information you want on the screen using everyday language.

Once you have completed your design the program code is written and stored on disk. Running the self-created program does not need the help of Codewriter.

With the help of this Commodore Approved Product it is possible to devise a series of programs to your own requirements instead of hiring a programmer to produce expensive tailor-made software or buying an 'off-the-shelf' product which may fall short of your specific needs.

**Contact:** Dynotech Microsoft, Summerfield House, Vale, Guernsey, Channel Islands, UK, telephone: 0481 20155.

## Joining forces for an education course

Pergamon Infotech have joined forces with Digital Research to announce a new game called the Microcomputer Education Programme.

The aim of the course is to provide a comprehensive training programme for business and professional users of CP/M and associated system software, languages and development tools. Five of these courses are to be held in London or Manchester early in 1984.

Two of the courses will last for two days dealing with CP/M-86 and advanced

graphics and the use of spreadsheets under CP/M. A one day course will introduce the programming language LOGO and two week long courses will teach PASCAL/MT+ and the language C.

The fees for the course are as follows: The one day course costs £80; two day courses cost £130; courses covering the whole week cost £250. All of these fees are subject to VAT.

**Enquiries** should be directed to Pergamon Infotech, Berkshire House, Queen Street, Maidenhead, Berkshire SL6 1NF telephone 0628 39101.

## BBC go soft

The BBC have launched their latest service, the Telesoftware service, which enables users of the BBC computer with a special Teletext adaptor to load programs stored on the pages of Ceefax.

Much of the software takes the form of educational programs, the remainder comprising mainly of utility programs. These programs, of which there are about half a dozen, will be changed every two weeks.

At the moment the bulk of the material on the service comes from the BBC themselves although software will

be commissioned out in the future as the system develops.

The cost of the service will be 399 for the BBC micro plus 225 for the adaptor.

The service, which the BBC claims to be the first of its kind in the world, was officially launched in September by John Butcher, the Parliamentary under-Secretary at the Department of Industry.

The BBC claim that the service is not in direct competition with the telephone bound service, Micronet 800 which also enables the user to download programs from a master database.

## Mr Micro's RAM dam

Mr Micro have produced an adaptor for the VIC called the 'RAM Dam' which should overcome loading problems that often occur when games requiring 3k expansion will not work with 8k or 16k expansion.

The idea behind this is that the adaptor, when used in conjunction with a Commodore 8k or 16k RAM pack, will fool the machine into believing that it has only 3k fitted.

This means that owners of the 8k or 16k RAM packs for the VIC do not have to purchase a

3k expansion pack to access programs which require 3k. The cost of this adaptor is £13.95 including VAT.

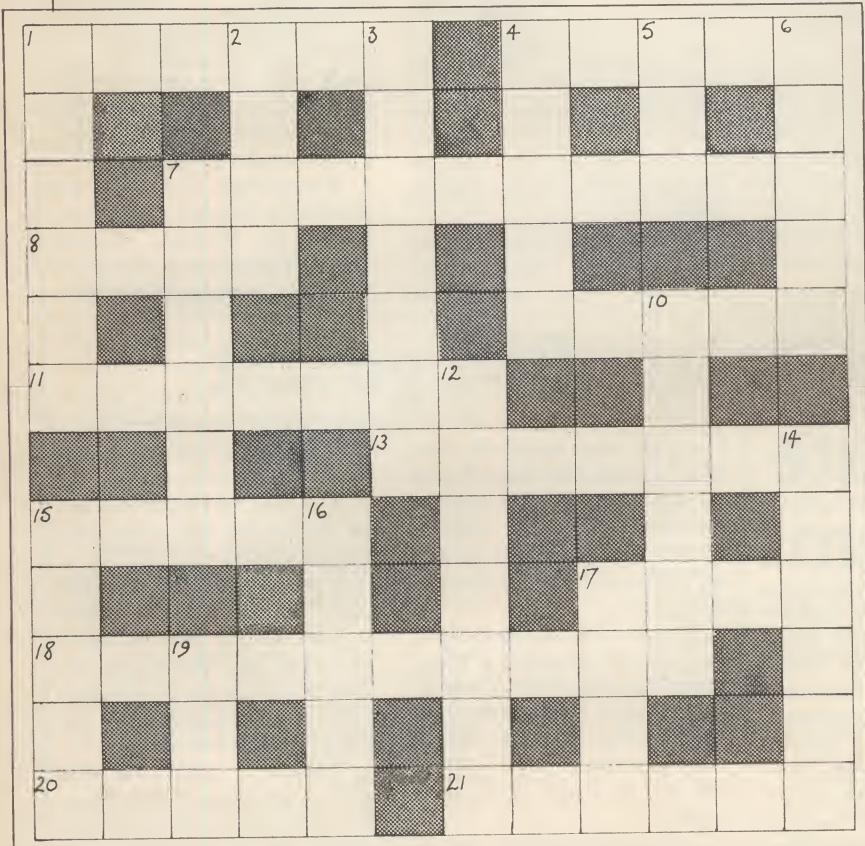
To add to the value of the package, Mr Micro have included a game called 'Microvaders' which will also act as a test program just in case VIC owners want to test their 16k RAM before using RAM Dam.

**Contact:** Mr Micro, 69 Partington Lane, Swinton, Manchester M27 3AL, telephone 061-728 2282.

# PUZZLES

The temptation was too much. For the rest of the year Commodore Computing International is a fairly serious magazine. But Christmas is the time for a little light-hearted entertainment. So here's a page of puzzles. There's even a chance to win a prize!

There are two levels of difficulty to the Crossword. You can tackle it in the normal way in which case we think you'll find it fairly easy, but hopefully not too easy. Or you could try doing it with your eyes closed!



1) Start with a Commodore machine in 3/4 time and you will become one to whom something happens.

4) An illuminating contest, they agree.

7) No Pepsi, son? That means nasty letters.

8) Basically, a look inside.

9) Keen sighted bird feels under par.

11) Conrad I call extreme.

13) How can a statue be free?

15) Disables so he gets the reverse of curse.

17) Lou's muddled up a heartfelt song.

18) Train a charged particle to give a facial indication of feeling.

20) In this barren idea is a backward eater.

21) When PE is relative ...

## DOWN

1) This evening the star says his prayers in the sixth canonical hour.

2) Into Oklahoma, taken past tense situation.

3) Tuneful computer assists learning about melodious drama.

4) I'm in certain meat.

5) Connection between a neck and a knot.

6) He has tea in a hurry.

7) Inventor of a Commodore machine sells his wares.

10) This woman with problem hair literally petrifies you.

12) I sail on to form a link.

14) This colourful fellow initially starts with a question.

15) Making money from flour and water?

16) Send the cattle in a different direction. Turn the cattle.

17) You in Soap? I'll drink this to that!

18) A jokey sort of crossword, without the anger. (And that's the last clue – and the last example of one of these!)

Finally the puzzle with a prize – a year's subscription to Commodore Computing International.

One criticism of computers is that they tend to make people think too logically. We thought we'd therefore approach this puzzle illogically! Here are the answers to a number of questions. We want you to provide the questions!

The winner of the competition will be the reader who provides, in the editor's view, the most imaginative questions. Needless to say the editor's decision is final and no correspondence can be entered into. Closing date for entries is Friday December 30. Send your entries, marked 'Puzzle' to the editor.

1) 42

6) Loop the loop

2) MC<sup>2</sup>

7) Mouse and bug

3) 3.142857 in the sky 8) a: both; b: none

4) Light program 9) 1952

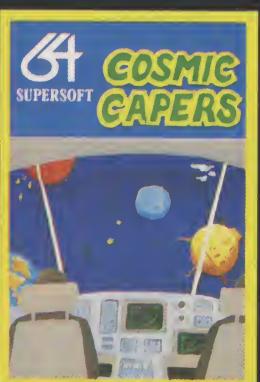
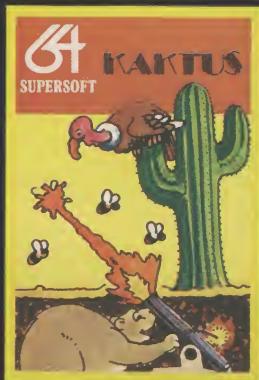
5) Constantly variable 10) Pascal's Triangle.

**ANSWERS TO THE CROSSWORD PUZZLE WILL  
APPEAR IN THE NEXT ISSUE OF COMMODORE  
COMPUTING INTERNATIONAL.**

**Name of the winner of the competition will be  
published in our February issue.**

# CAN YOU BEAT OUR GREAT GAMES

We've got the biggest (and best) selection of games for the Commodore 64. We think they're unbeatable



## MORE THAN GAMES . . .

Our FREE catalogue lists dozens of programs for your Commodore 64 to help you run your business, write programs, or just enjoy yourself. We've been producing top quality software since 1978. So if you want the best, just remember our name . . .

**SUPERSOFT**

SUPERSOFT, Winchester House, Canning Road, Wealdstone, Harrow, Middlesex, HA3 7SJ Telephone: 01-861 1166

ARCADE GAMES (machine code)	£8.95
STIX	£8.95
CRAZY KONG	£8.95
AKAKTUS	£8.95
WILDFIRE	£6.95
3D GLOOPER	£8.95
MANGROVE	£8.95
TANK ATAK	£8.95
ADVENTURE GAMES	£9.95
STREETS OF LONDON	£9.95
GOBLIN TOWERS	£7.95
COSMIC CAPERS	£7.95
CRACKS OF FIRE	£7.95
FORESTLAND	£7.95
FANTASY GAMES	£9.95
HALLS OF DEATH	£7.95
LORD OF THE BALROGS	£8.95
Post free	£6.95

These prices include VAT.

# Connect a Keyboard



One of the major attractions of the CBM-64 is its potential as a musical instrument. There are some excellent keyboards and interfaces on the market for use with the 64 but we decided it would be fun to put together a system ourselves. Here we publish the results of our efforts – we're proud of the results and we think you will be impressed.

You don't need to be a programming genius or an electronics expert for this project. It is even possible to follow it through without actually understanding what you're doing but we have done our best to explain what's happening as we go along.

The final result will be a mini piano keyboard connected to a CBM-64 capable of producing three voices at any one time. The characteristics of these voices can be changed by altering the waveform to produce all kinds of wonderful special effects. We will be publishing programs in future issues which will enable you to produce a wide range of such effects.

The first part of the article deals with the interface. It may sound complicated to those who have never picked up a soldering iron but all you need is a steady hand and a little patience.

The second part of the article is the program which actually makes the pressing of a key produce a sound. The third part is a Basic program which will enable to change the sound.

The interface to connect the 64 computer to the music keyboard has been made as simple as possible but still allows for future expansion of the system. It uses only five Integrated Circuits and connects via a edge connector and ribbon cable to

## PARTS LIST

One 49 key piano-type keyboard (we obtained ours from Maplin Electronic Supplies)

One Vero board (36 strip by 60 hole)  
Four 24 pin Integrated Circuit (IC) sockets

One 14 pin IC socket  
One 16 pin IC socket  
Eight 19-way board plugs  
Eight 10-way board sockets  
Four 74150 multiplexers  
One 7417 or 74LS17 buffer driver  
Connecting wire  
One 16-way dual-in-line plug  
16-way ribbon cable  
One 24-way edge connector to fit user port

# to a Commodore 64

the user port on the 64. The ribbon cable connects to the interface board with a 16 way dual-in-line plug. If you made the D/A converter in September then you may use that cable. There are no wiring changes required.

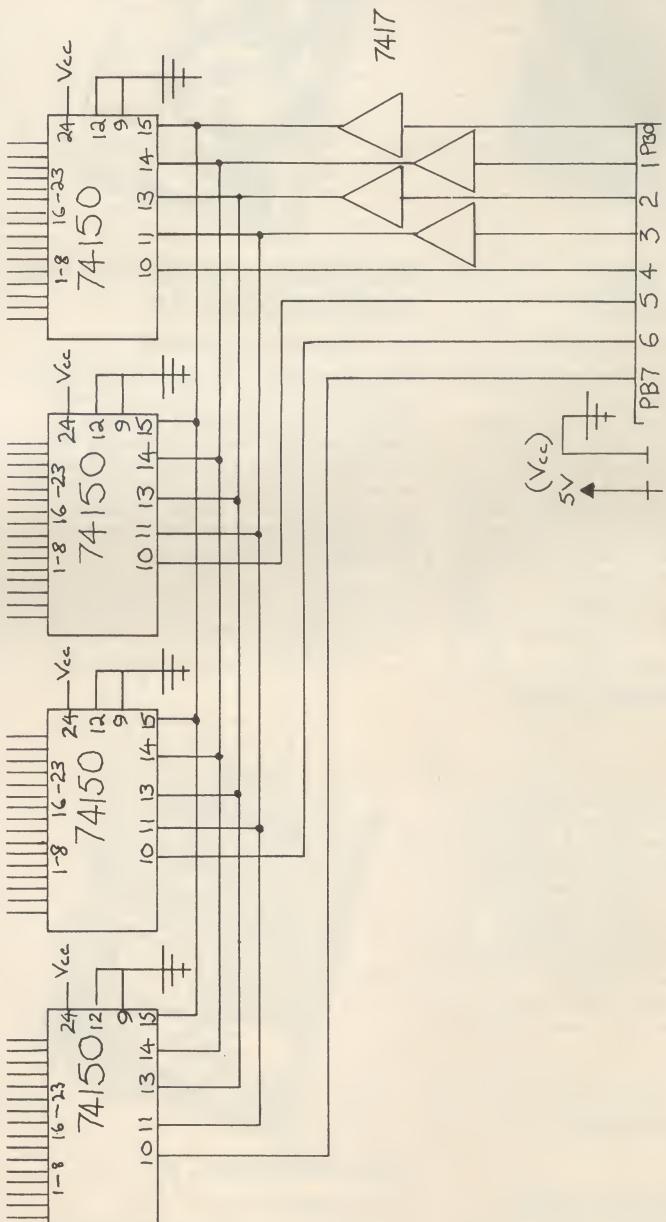
We built the interface on a piece of vero board so if you choose to follow the same construction method we used you will have to do some soldering and mind your fingers when cutting the tracks on under side of the board.

The board uses 4 multiplexer chips. Each one of these can decode a four bit binary number (0 – 15) and use it to select one of its 16 input pins. If the pin selected is connected to ground (in our case this would mean that the key connected to that input pin was being held down) then the chip's output pin is set to 1.

On our board all 4 of these chips are fed with the same 4 bit number after it has gone through the buffer chip. The number is fed to the board down the least significant 4 bits of the user port. The upper four bits are used to return the four replies from the multiplexers to the computer.

The program to drive this interface is written in machine code. It scans the piano type keyboard for keys that are held down. As the SID chip only has three voices only the first three keys held down at any one time will produce sound. The program resides at 49152 (C000 hex) onwards and is set into the 64's interrupts. This means that when you initialise the program (SYS 49520) the computer will come back with a "READY" message immediately and will continue working as normal (perhaps a little slower) but if all is well the computer will produce sounds through the TV set when the keys are pressed on the new keyboard.

The program scans the keyboard by sending the numbers 0 to 15 to the least significant 4 bits of the user port and testing the upper four bits for 1's after each number was sent. If one of these bits is sent then it means a key was pressed in the corresponding block of 16 keys on the keyboard (one 16 key block is connected to one multiplexer chip). The number of the key in the block is given by the last number sent to the interface. So the exact key being held down is known, this can then



be used to look up a table for the numbers to be sent to the SID chip to create the correct tone.

## The User Port Connection

Pins numbered 1 to 8 on the dual-in-line plug are connected to C to L on the user port edge connector. Pins 16 and 15 are connected to A and 2 respectively. For

user port tables see the CBM-64 User Manual, page 153.

## Keyboard Connections

The earth wire which leaves the circuit board from the top left corner connects to the earth bar which is common to one side of all the keyboard switches.

# New books for the Commodore 64 and Vic-20



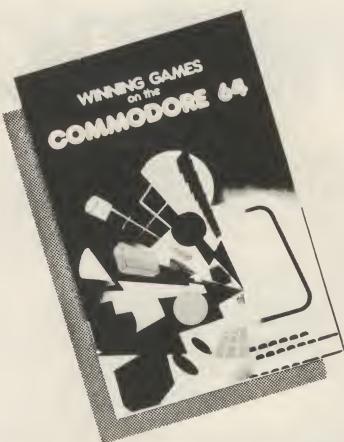
## MASTERING THE COMMODORE 64

by A.J. Jones and G. Carpenter

Commences with a description of BASIC keywords, each keyword or group of keywords illustrated by a short program. The coverage of BASIC tools includes PRINT formatting and string handling. There is an explanation of how variables and strings are stored in memory, whilst simple data structures, sort and merge data list are included: a simple program illustrates these techniques.

085312 6542 app. 260pp Dec'83 app. £6.95

Published by Ellis Horwood Ltd., and marketed by John Wiley and Sons Ltd.



## WINNING GAMES ON THE COMMODORE 64

by T. Barrett and S. Colwill

Taking you from a simple understanding of BASIC this book builds up in single stages the techniques of graphics programming on the Commodore 64. It contains many advanced tips and hints which will help you to write fast-moving graphics games in BASIC. To facilitate this end, the book includes Basic Loaders for Machine Code routines.

085312 695X app. 130pp Jan'84 app. £5.95

Published by Ellis Horwood Ltd., and marketed by John Wiley and Sons Ltd.



## WINNING GAMES ON THE VIC-20

by T. Barrett and A.J. Jones

This book is a collection of games which can be played on the VIC-20. After reading the machine user's manual, you should have no trouble in keying in and running the programs: the text is supplemented by a chapter on redefining graphic characters, containing detailed instructions on the character generator program CHARGEN.

08531 2697 6 app. 130pp Jan'84 app. £5.95

Published by Ellis Horwood Ltd., and marketed by John Wiley and Sons Ltd.

## GETTING MORE FROM YOUR 64

by Mark Harrison

This — the third book by Mark Harrison — takes you beyond the Commodore manual and shows you how to use your 64 to the full. The book is a complete introduction to computing covering how the 64 and other computers work, programming in Commodore BASIC, using the 64's dazzling graphics abilities, sound and advanced concepts.

0905 104 595 app. 200pp Dec'83 app. £7.25

Published by Sigma Technical Press and marketed by John Wiley & Sons Ltd.

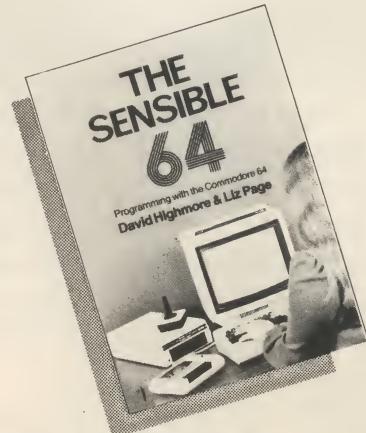
## VIC-20 MINDSTRETCHERS

by Ian Creasey

In this book, you'll find 30 programs ranging from exciting video games such as *Bomber*, *Alien Attack* and *Munchers*, right through to games of strategy and programs that will make your life as a programmer that much easier. To help you increase your own programming skills it includes a comprehensive section on creating your own programs. How would yours compare with any of these: *Life* • *Mastermind* • *Breakout* • *Zombies* • *Submarine* • *Stepping Stones* • *Snake* • *Function Keys* • *Shrink?*

0905 104 692 app. 160pp Dec'83 app. £5.95

Published by Sigma Technical Press and marketed by John Wiley and Sons Ltd.



## THE SENSIBLE 64

by D. Highmore and L. Page

This book provides you with a simple, concise explanation of the first sensible computer for business or leisure use. Starting with the more fundamental aspects of this remarkable machine and progressing logically to complex aspects such as using a disk drive, graphic printer, multicolour and Sprite graphics, it covers those topics that are so often only found in manuals or immersed in technicalities.

09467 05 003 128pp £5.95

Published by Microbooks and marketed by John Wiley and Sons Ltd.

JOHN WILEY & SONS LTD. are major publishers and distributors of books and software for the computing world. As well as Wiley professional reference books and software an extensive range of titles for the student and hobbyist is available by other leading publishers including Ellis Horwood, NCC, Sigma Technical Press, Sinclair Browne and Sulis Software.

For further details ask now at any good bookshop or write to Annabella Duckit, Dept. CC, at the address below.



John Wiley & Sons Ltd.,

FREEPOST,

Baffins Lane,

CHICHESTER,

West Sussex

PO19 1YP

Connect the other side of these keyboard switches as follows:

Start from the left end of the keyboard as you look at it from the front. The wires from the first 16 switches connect to the pins around the top right multiplexer – numbered 7 (zero) on the circuit diagram. Note that two pins have been cut from the plugs each side of the multiplexer. The second 16 wires working from the left on the keyboard connect to the 16 pins on plugs at the sides of multiplexer number 1 (one) on the diagram. Wires from the third set of 16 switches are connected to the pins on the plugs at the side of chip number two. The final wire – number 4a – connects to pin 1 on the plug on the right side of chip 3.

Remember that you are working from left to right on the keyboard. But each set of 16 wires from the keyboard switches are connected to each set of pins on the plugs on each chip in clockwise fashion. The first wire, from the extreme left end of the keyboard is connected to the first pin at the top corner of the plug on the right side of chip O – bearing in mind, of course, that the first two pins at the top of each plug have been removed.

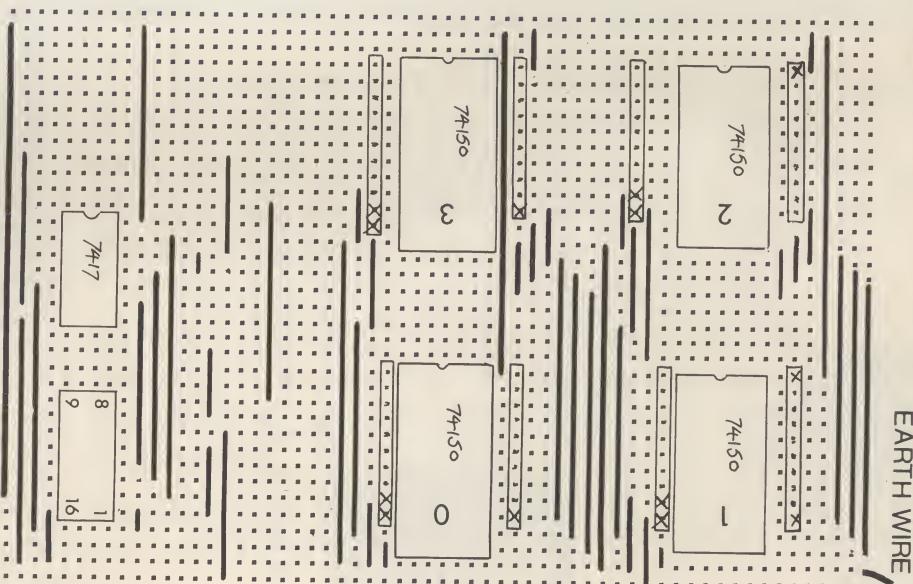
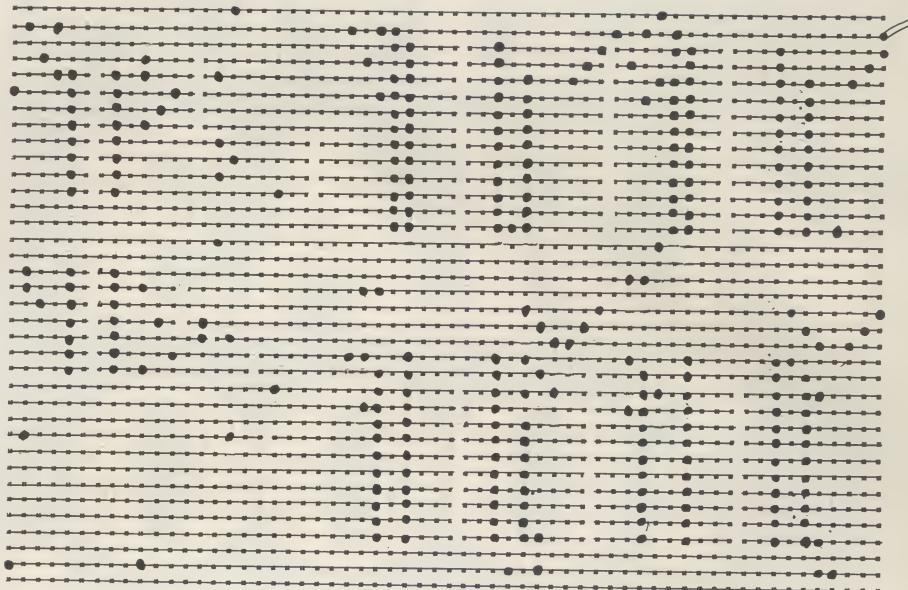
The eighth wire is connected to the last pin at the bottom of the plug on the right side of the chip. On our diagram of the chip we have numbered the plug pins 1 to 16 to make it even clearer. The pattern is followed on each chip, down the right hand side and up the left hand side.

## The Method

The routine that enables the use of the keyboard described in this section is of the simplest form for use of the SID chip. The method of execution of the program, however, is a bit more interesting.

The entry point to the routine is only called once by you. In that routine the actual decoding routine is 'wedged' into the interrupts so that every time an interrupt occurs, the keyboard is scanned and if a key (or keys) have been pressed, the corresponding note is taken from the look-up table and played through the SID chip.

When we say 'every time that an interrupt occurs', we mean about every  $\frac{1}{60}$  of a second the playing of the notes is updated. Also 'wedging into interrupts' means that the address of the decoding routine is put into the interrupt (IRQ) vector and at the end of the routine, operation is sent to the original IRQ.



Using interrupts means that the computer is free to control Basic programs and still control the keyboard (a two user system with one playing the keyboard and one programming).

## The Decoding Routine

The actual routine starts at \$C180 (49536 dec). In this routine all the registers are pushed onto the stack, the decoding routine is called (\$C0C1), the registers are restored, and a jump to the IRQ routine is executed.

The routine from \$C0C1 to \$C168 is in two parts: the first part is to read in from the keyboard and decode the values.

received into a number between 0 and 40 for the relevant key pressed and the second routine plays the note.

# Keyboard Program Description

## The First Part

In this part, the 16 values mentioned earlier that are sent to the interface are

# MUSIC

sent and the returned value is read back. The command LDA (#03,X) at location \$C0C6 has no relevance to the program except to create a pause to ensure that a value is returned from the interface. The value returned is then stored in memory and tested to see if any of the upper four bits are set and if so calculate the value in the table and store it in memory. This is repeated for each of the upper four bits

and the loop is repeated sixteen times.

If, during this loop, a third key has been detected, the loop is ended and the play routine is started. If three values have not been found within the routine, the remaining locations for store are filled with zero's.

It must be noted that there is no selection of the notes and therefore all three voices in the SID chip must be set to

the same. In the next issue we will produce a routine that is selective about the voice it is playing.

## The Second Part

In this part, the values received from the first part are taken and converted to the frequencies of the notes via the look-up table and played.

## **Presentation of Programs**

The machine code program is seen as a memory dump of the look-up table with a disassembly of the actual routines.

Following the monitor displays is the

program that most of you will use to enter the routine. This is in the form of a Basic loader and enters the table and machine code routine and initialises the routine by SYS(49520). This is check-summed so that

if there is an error in the data, you will be informed of it before it can crash the machine.

The last listing is the Basic program that produces the 'vibrato' effect.

```

READY.
B*
    FC  SR  AC  XR  YR  SP
    ., 003E 32 00 83 00 F6
    ., C000 00 00 93 08 15 09 9F 09
    ., C008 32 0A CD 0A 71 0B 20 0C
    ., C010 D8 0C 9C 0D 6B 0E 47 0F
    ., C018 2F 10 26 11 2B 12 3F 13
    ., C020 64 14 9B 15 E3 16 40 18
    ., C028 B1 19 38 1B D7 1C 8E 1E
    ., C030 5F 20 40 22 56 24 7F 26
    ., C038 C9 28 36 2B C7 2D 80 30
    ., C040 63 33 71 36 8E 39 1C 3D
    ., C048 BE 40 98 44 AC 48 FE 4C
    ., C050 92 51 6C 56 8F 5B 01 61
    ., C058 C6 66 E2 6C 5C 73 38 7A
    ., C060 7C 81 30 89 FF FF 00 00
    ., C068 FF FF 00 00 FF FF 00 00
    ., C070 FF FF 00 00 FF FF 00 00
    ., C078 FF FF 00 00 7F FF 00 00
    ., C080 A9 0F    LDA #$0F
    ., C082 8D 03 DD STA $DD03
    ., C085 A9 00    LDA #$00
    ., C087 8D 05 D4 STA $D405
    ., C088 8D 0C D4 STA $D40C
    ., C08D 8D 13 D4 STA $D413
    ., C090 A9 F0    LDA #$F0
    ., C092 8D 06 D4 STA $D406
    ., C095 8D 00 D4 STA $D40D
    ., C098 8D 14 D4 STA $D414
    ., C09B A9 0F    LDA #$0F
    ., C09D 8D 18 D4 STA $D418
    ., C0A0 A9 11    LDA #$11
    ., C0A2 8D 04 D4 STA $D404
    ., C0A5 8D 0B D4 STA $D40B
    ., C0A8 8D 12 D4 STA $D412
    ., C0AB A9 00    LDA #$00
    ., C0AD 8D 02 D4 STA $D402
    ., C0B0 8D 09 D4 STA $D409
    ., C0B3 8D 10 D4 STA $D410
    ., C0B6 A9 08    LDA #$08
    ., C0B8 8D 03 D4 STA $D403
    ., C0B9 8D 0A D4 STA $D40A
    ., C0BE 8D 11 D4 STA $D411
    ., C0C1 A0 00    LDY #$00
    ., C0C3 8C 01 DD STY $DD01
    ., C0C6 A1 03    LDA ($03,X)
    ., C0C8 AD 01 DD LDA $DD01
    ., C0CB 85 02    STA $02
    ., C0CD 29 20    AND #$20
    ., C0CF F0 0F    BEQ $C0E0
    ., C0D1 18      CLC
    ., C0D2 98      TYA
    ., C0D3 69 11    ADC #$11
    ., C0D5 A6 FB    LDX $FB
    ., C0D7 95 FC    STA $FC,X
    ., C0D9 E8      INX

```

# GAME TO EARN £1,000?



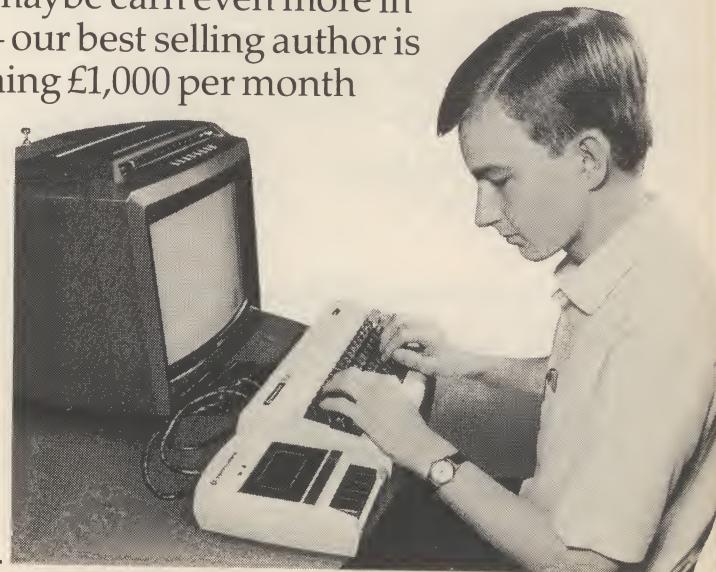
Just one good marketable game, educational or strategic simulation program could earn you, as author, up to £1,000 as a lump sum if you sell the rights in it to Logic 3 – Britain's fastest-growing company in home computer software.

Or keep the copyright, take a royalty on sales, and maybe earn even more in the long run – our best selling author is currently earning £1,000 per month in royalties.

Logic 3 is now looking for new high quality entertainment and educational software products to run on the leading home computers – particularly Commodore 64, Acorn Electron, Sinclair Spectrum and Dragon.

Write or phone Andrew Goltz at Logic 3, Mountbatten House, Victoria Street, Windsor (07535-57181) to know more.

But soon.



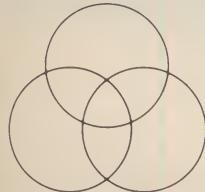
Or send the coupon for the Logic 3 software catalogue.

Name \_\_\_\_\_

Address \_\_\_\_\_

\_\_\_\_\_

Type of computer \_\_\_\_\_



**LOGIC 3**

THE KEY TO THE WORLD OF TOMORROW

Logic 3 Ltd., Mountbatten House, Victoria Street, Windsor SL4 1HE. Telephone: (07535) 57181



## COMPUTER CLUB INTERNATIONAL

Reserve **YOUR**  
**Membership today**

CCI is a NEW COMPUTER CLUB specifically for you—the home computer enthusiast—whether or not you own a computer.

Members will enjoy a wide range of facilities, including their own magazine, regional meetings, contact with international members, exchange of software and many other benefits, all at very reasonable cost. Make sure of your membership reservation today.

Complete the coupon and send to—

Computer Club International  
FREEPOST  
(NO STAMP REQUIRED)  
STALYBRIDGE  
CHESHIRE  
SK15 1YD

**DO NOT SEND MONEY WITH COUPON**

### MEMBERSHIP RESERVATION

Please include my name on the CCI Membership Reservation List and send me further details without any obligation on my part to join.

SURNAME \_\_\_\_\_

FORENAME/S \_\_\_\_\_

ADDRESS \_\_\_\_\_

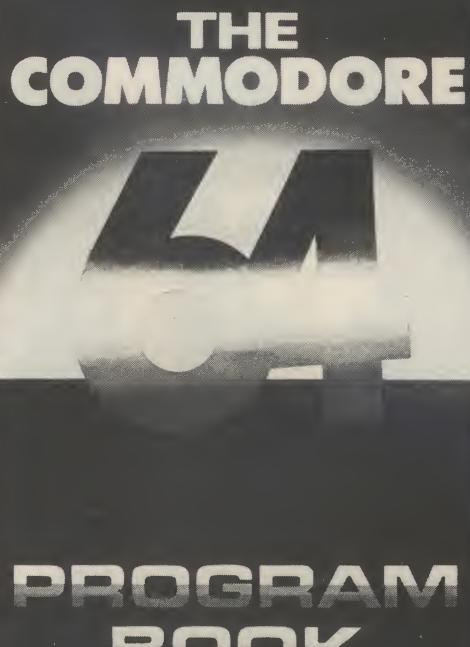
TOWN \_\_\_\_\_

COUNTY \_\_\_\_\_

POSTCODE \_\_\_\_\_

COMPUTER OWNED \_\_\_\_\_

**GAMES  
ADVENTURES  
MACHINE CODE AIDS**



This sparkling collection  
of programs uses the full colour  
and sound capabilities of your **64**.

Seek treasure in the  
**'Forbidden City'**  
pilot yourself with  
**'Flight Simulation'**  
use a versatile assembler/disassembler.

**£4.95**

All good bookshops *or from*

**PHOENIX**  
PUBLISHING ASSOCIATES  
14 VERNON ROAD BUSHEY  
HERTFORDSHIRE WD2 2JL  
TEL WATFORD 32109

£4.95 plus 55p P&P

NAME .....

ADDRESS .....

.....

POSTCODE .....

# MUSIC

.. C0DA E0 03	CPX #\$03	.. C132 D0 F9	BNE \$C12D
.. C0DC F0 56	BEQ \$C134	.. C134 A5 FC	LDA \$FC
.. C0DE 86 FB	STX \$FB	.. C136 0A	ASL
.. C0E0 A5 02	LDA \$02	.. C137 A8	TAY
.. C0E2 29 40	AND #\$40	.. C138 B9 00 C0	LDA \$C000,Y
.. C0E4 F0 0F	BEQ \$C0F5	.. C13B 8D 00 D4	STA \$D400
.. C0E6 18	CLC	.. C13E B9 01 C0	LDA \$C001,Y
.. C0E7 98	TYA	.. C141 8D 01 D4	STA \$D401
.. C0E9 69 21	ADC #\$21	.. C144 A5 FD	LDA \$FD
.. C0EA A6 FB	LDX \$FB	.. C146 0A	ASL
.. C0EC 95 FC	STA \$FC,X	.. C147 A8	TAY
.. C0EE E8	INX	.. C148 B9 00 C0	LDA \$C000,Y
.. C0EF E0 03	CPX #\$03	.. C14B 8D 07 D4	STA \$D407
.. C0F1 F0 41	BEQ \$C134	.. C14E B9 01 C0	LDA \$C001,Y
.. C0F3 86 FB	STX \$FB	.. C151 8D 08 D4	STA \$D408
.. C0F5 A5 02	LDA \$02	.. C154 A5 FE	LDA \$FE
.. C0F7 29 10	AND #\$10	.. C156 0A	ASL
.. C0F9 F0 0F	BEQ \$C10A	.. C157 A8	TAY
.. C0FB 18	CLC	.. C158 B9 00 C0	LDA \$C000,Y
.. C0FC 98	TYA	.. C15B 8D 0E D4	STA \$D40E
.. C0FD 69 01	ADC #\$01	.. C15E B9 01 C0	LDA \$C001,Y
.. C0FF A6 FB	LDX \$FB	.. C161 8D 0F D4	STA \$D40F
.. C101 95 FC	STA \$FC,X	.. C164 A9 00	LDA #\$00
.. C103 E8	INX	.. C166 85 FB	STA \$FB
.. C104 E0 03	CPX #\$03	.. C168 60	RTS
.. C106 F0 20	BEQ \$C134	.. C169 EA	NOP
.. C108 86 FB	STX \$FB	.. C16A EA	NOP
.. C10A A5 02	LDA \$02	.. C16B EA	NOP
.. C10C 29 80	AND #\$80	.. C16C EA	NOP
.. C104 E0 03	CPX #\$03	.. C16D EA	NOP
.. C106 F0 20	BEQ \$C134	.. C16E EA	NOP
.. C108 86 FB	STX \$FB	.. C16F EA	NOP
.. C10A A5 02	LDA \$02	.. C170 78	SEI
.. C10C 29 80	AND #\$80	.. C171 A9 80	LDA #\$80
.. C10E F0 0F	BEQ \$C11F	.. C173 8D 14 03	STA \$0314
.. C110 18	CLC	.. C176 A9 C1	LDA #\$C1
.. C111 EA	NOP	.. C178 8D 15 03	STA \$0315
.. C112 A9 31	LDA #\$31	.. C17B 20 80 C0	JSR \$C080
.. C114 A6 FB	LDX \$FB	.. C17E 58	CLI
.. C116 95 FC	STA \$FC,X	.. C17F 60	RTS
.. C118 E8	INX	.. C180 08	PHP
.. C119 E0 03	CPX #\$03	.. C181 48	PHA
.. C11B F0 17	BEQ \$C134	.. C182 98	TYA
.. C11D 86 FB	STX \$FB	.. C183 48	PHA
.. C11F C8	INY	.. C184 8A	TXA
.. C120 98	TYA	.. C185 48	PHA
.. C121 29 0F	AND #\$0F	.. C186 20 C1 C0	JSR \$C0C1
.. C123 F0 04	BEQ \$C129	.. C189 68	PLA
.. C125 A8	TAY	.. C18A AA	TAX
.. C126 4C C3 C0	JMP \$C0C3	.. C18B 68	PLA
.. C129 A6 FB	LDX \$FB	.. C18C A8	TAY
.. C12B A9 00	LDA #\$00	.. C18D 68	PLA
.. C12D 95 FC	STA \$FC,X	.. C18E 28	PLP
.. C12F E8	INX	.. C18F 4C 31 EA	JMP \$EA31
.. C130 E0 03	CPX #\$03		

# "The greatest spreadsheet since Visicalc"

Commodore User Magazine

Clear and easy to use

2000 cells  
(600 in 16K VIC 20)

Global column  
width adjustment

Variable individual  
column width

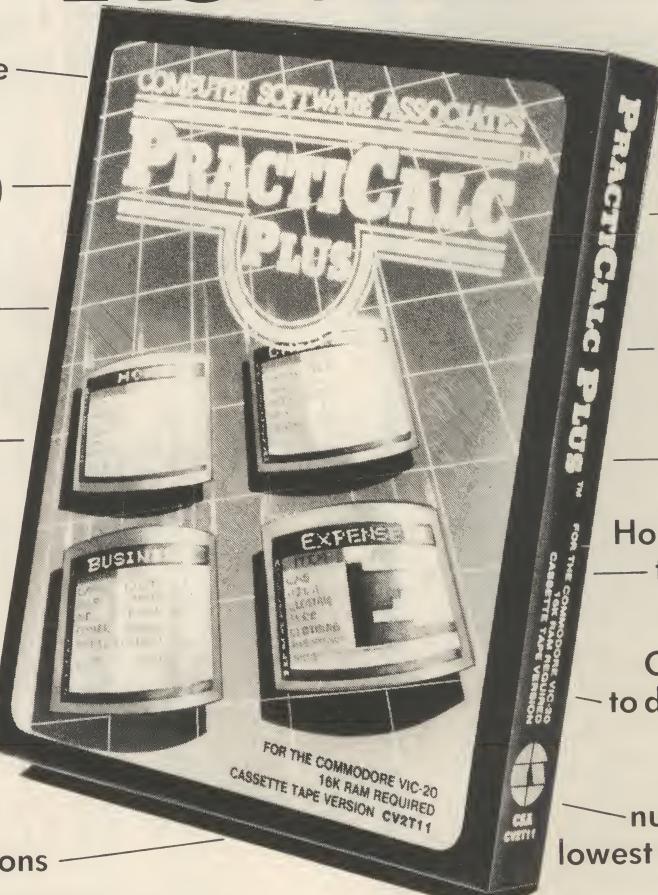
Insertion or deletion  
of rows and  
columns

Save, load and  
merge  
capabilities.

22 mathematical  
and statistical functions

In America, Practicalc has swept to the top of the software charts. Commodore User Magazine described it as "storming American Vics as the greatest spreadsheet since Visicalc".

And no wonder since this program from Computer Software Associates provides 16K VIC 20 and Commodore 64 users with a real business spreadsheet to



Formatting by cell  
or whole sheet

Fast alpha-  
numeric search

Comprehensive  
instruction manual

Replication across  
columns and rows

Horizontal and vertical  
titles can be fixed

Graphics facility  
to display your results

Powerful alpha-  
numeric sort, highest to  
lowest and lowest to highest

use at home. Sales forecasts, budgets, cashflow projections, financial modelling, are easy with Practicalc.

Now it's being stocked by Britain's leading computer stores like Boots, W.H. Smiths, Curry's Micro C, John Lewis and Spectrum dealers.

Call in and ask for a demonstration or clip the coupon for full details.

## NOW AVAILABLE IN U.K. FROM JUST £29.95\*

\*16K VIC 20 cassette.

Another great program from



**COMPUTER  
SOFTWARE  
ASSOCIATES**

For more information send this coupon to:  
**Marketing Micro Software Ltd.**

Name .....  
Address .....  
.....

Personal enquiry (please tick)

Dealer enquiry (please tick)

Goddard Road, Whitehouse Ind. Est., Ipswich, Suffolk IP1 5NP.

```

10 I=49152:T=0
20 READA:IFA=-1THEN50
30 POKEI,A:I=I+1:T=T+A
40 GOTO20
50 IFTC>46943THENPRINT"DATA ERROR 46943" T:END
60 PRINT"DATA OK. KEYBOARD NOW ACTIVATED."
70 SYS 49520
80 END
100 DATA0,0,147,8,21,9,159
110 DATA9,50,10,205,10,113,11
120 DATA32,12,216,12,156,13,107
130 DATA14,71,15,47,16,38,17
140 DATA43,18,63,19,100,20,155
150 DATA21,227,22,64,24,177,25
160 DATA56,27,215,28,142,30,95
170 DATA32,76,34,86,36,127,38
180 DATA201,40,54,43,199,45,128
190 DATA48,99,51,113,54,174,57
200 DATA28,61,190,64,152,68,172
210 DATA72,254,76,146,81,108,86
220 DATA143,91,1,97,198,102,226
230 DATA108,92,115,56,122,124,129
240 DATA48,137,255,255,0,0,255
250 DATA255,0,0,255,255,0,0
260 DATA255,255,0,0,255,255,0
270 DATA0,255,255,0,0,127,255
280 DATA0,0,169,15,141,3,221
290 DATA169,0,141,5,212,141,12
300 DATA212,141,19,212,169,240,141
310 DATA6,212,141,13,212,141,20
320 DATA212,169,15,141,24,212,169
330 DATA17,141,4,212,141,11,212
340 DATA141,18,212,169,0,141,2
350 DATA212,141,9,212,141,16,212
360 DATA169,8,141,3,212,141,10
370 DATA212,141,17,212,160,0,140
380 DATA1,221,161,3,173,1,221
390 DATA133,2,41,32,240,15,24
400 DATA152,105,17,166,251,149,252
410 DATA232,224,3,240,86,134,251
420 DATA165,2,41,64,240,15,24
430 DATA152,105,33,166,251,149,252
440 DATA232,224,3,240,65,134,251
450 DATA165,2,41,16,240,15,24
460 DATA152,105,1,166,251,149,252
470 DATA232,224,3,240,44,134,251
480 DATA165,2,41,128,240,15,24
490 DATA234,169,49,166,251,149,252
500 DATA232,224,3,240,23,134,251
510 DATA200,152,41,15,240,4,168
520 DATA76,195,192,166,251,169,0
530 DATA149,252,232,224,3,208,249
540 DATA165,252,10,168,185,0,192
550 DATA141,0,212,185,1,192,141
560 DATA1,212,165,253,10,168,185
570 DATA0,192,141,7,212,185,1
580 DATA192,141,8,212,165,254,10
590 DATA168,185,0,192,141,14,212
600 DATA185,1,192,141,15,212,169
610 DATA0,133,251,96,234,234,234
620 DATA234,234,234,234,120,169,128
630 DATA141,20,3,169,193,141,21
640 DATA3,32,128,192,88,96,8
650 DATA72,152,72,138,72,32,193
660 DATA192,104,170,104,168,104,40
670 DATA76,49,234,-1
READY.

```

## The Basic Program

The Basic program that has been included will produce a 'vibrato' effect using the volume register of the SID chip and any time that a key (1 – 4) is pressed, the waveform of all three voices will be changed to one of four different values. These values are for:

1. Triangle Waveform,
2. Sawtooth Waveform,
3. Pulse Waveform,
4. (Pulse AND Triangle) Waveform.

Apart from noise, these are the only good combinations available.

```

10 S=54272
20 FORI=5TO15STEP1
30 POKE$+24,I
35 GOSUB90
40 NEXT
50 FORI=15TO5STEP-1
60 POKE$+24,I
65 GOSUB90
70 NEXT:GOTO20
90 GETA$:IFVAL(A$)<1ANIMAL(A$)>4THENRETURN
95 ONVAL(A$)GOSUB100,105,110,115
96 RETURN
100 A=17:POKE$+4,A:POKE$+11,A:POKE$+18,A:RETURN
105 A=33:POKE$+4,A:POKE$+11,A:POKE$+18,A:RETURN
110 A=65:POKE$+4,A:POKE$+11,A:POKE$+18,A:RETURN
115 A=81:POKE$+4,A:POKE$+11,A:POKE$+18,A:RETURN
120 GOTO100
READY.

```

# Computer control

**The idea that the homes of the future would be run by computer has not materialised in the way that many people imagined. Instead of one central machine every item of equipment has its own chip. But we were inspired by The VIC-20 Connection written by James Coffron to take a closer look at computer control**

If you have recently bought a VIC-20, and all you have managed to do so far is run a few games, try your hand at a couple of simple quizzes and maybe had a look at one or two of the many wordprocessors available you may be wondering what has made the VIC 20 a best seller.

Well, of course you can have excellent software packages and hardware add-ons which, some people will claim, make the computer a best seller. This would only be true if one fact was overlooked. The hardware add-ons and software are only

available because the computer has the ability to make use of them in certain applications and that the VIC is a very versatile machine. Applications go far beyond the wordprocessors which come fifteen to the dozen. All the user has to do is stretch the imagination a little bit further than the simple (and ultimately trivial) games which urge you to exterminate the advancing hordes of aliens.

The point is that there are many applications in the home that the home computer can be used for. Have, for instance, you thought about using the VIC to operate a security system, control the temperature or operate a lighting system.

Even beginners, who know next to nothing about computers let alone how to adapt them to various home and office applications can try their hand at computer control.

The term computer control can only be fully explained after it has been realised that there are three necessary ingredients: 1) the controller, ie the computer 2) the controlled object or piece of equipment

3) a means of connecting the controller to the controlled. This is usually performed by an interface in its simplest form, a cable.

It is this cable which permits a two way flow of information. The computer sends the directions to the external piece of hardware as well as receiving information from it. Before this swapping of information and even before a system can be properly designed and implemented, it is essential that the requirements of the system and the task it is designed to perform are accurately and unambiguously defined.

A simple statement of the task is required first such as: 'the computer must control the temperature in the house so that if the temperature falls to less than 25 degrees Centigrade and/or it is between the hours of 7 and 8 in the morning and 9 and 12 at night, then the central heating must be switched on.' The problem is how can it be implemented?

Using an interface is only part of the answer because the information provided by the normal household thermometer is in an analogical form because there is an infinite number of potential values (temperatures). But the VIC is a digital computer and because of the necessity for accurate results, the output of the VIC is limited to predefined states (electrical impulses or the binary logic values of 0 and 1). A series of electrical impulses forms the data.

Thus, somehow the analogical information must be transformed into an electrical impulse which is capable of being decoded by the micro.

This transformation is performed by an electrical device called a transducer which may be bought as a separate unit or (for the electronics enthusiast) made at home. Transducers are necessary for most systems or devices which will not interface directly to the micro and which have an output (analog or digital) which can not immediately be recognised by the micro.

In the case of the thermometer the transducer will act as a temperature sensing device. It will receive two sets of input, one from the micro and one from the thermometer, and will release two sets of output, one to the micro and one to the thermometer. The voltage produced by this device can be related to the temperature by the equation

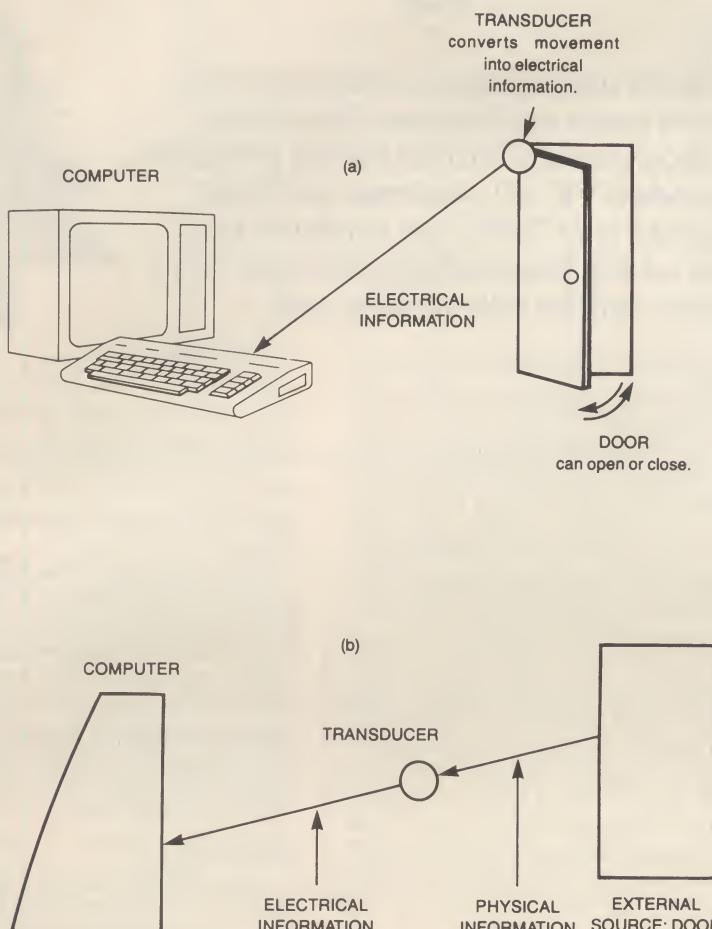
$$\frac{X \text{ kelvin}}{100} = \text{Voltage}$$

The remaining set of equations that needed to be included in the program to make the system work will probably require more advanced programming because the above equation has only calculated the voltage and not the actual temperature. The actual result can be achieved by multiplying the voltage by 100 and then by taking away the temperature in degrees Kelvin.

As an example, your result should go something like this, having calculated the voltage to be 3.532 and where degrees Kelvin = 273.2 (or in Centigrade, 0):

$$\begin{aligned} 3.532 \times 100 - 273.2 &= \\ 353.200 - 273.2 &= \\ 80 \text{ degrees C} \end{aligned}$$

# CONNECTIONS



**Top:** The physical movement of the door needs to be translated into electrical information which can be fed into the computer. This is done by way of a transducer.

**Bottom:** This block diagram shows exactly how the transducer fits into the system designed to turn the movement of the door into information which the computer can understand. The transducer's job is to measure or record a physical event. That physical event – the opening of the door, for instance, is the input into the transducer. The output of the transducer will be an electrical signal directly related to the physical event and output to the computer.

This feature is based on information from *The VIC-20 Connection* written by James W. Coffron and published by Sybex.

The timing device is simply a pulse counter counting in hours minutes and seconds but this device (which is usually built in to the micro) has to be set to the times the user requires. This, of course, means using strings of variables and programming following the format of inputting the message, say under string A\$, setting the timer to A\$ and then entering the statement. For example, the data in the string in this example should go hours, minutes and seconds in the form 122436. The next step is to start the clock. On the 64, the instruction for this would be `TI$=A$` where `TI$` is the address of the clock. The final step is the checking device like `IF TI$=... then switch the central heating on/off.`

Obviously, in a system where no timing is required there is no need to address the timer.

Such a system might be a security device where an alarm is activated by the movement of a door or window. In this case, the micro will need to monitor all the appropriate windows, doors and primary alarm systems and the major ingredient in the program will actually be a drawing of the house. Outside the program, ordinary switches need to be attached so that when the door or window is closed, the switch is closed and conversely when the door or window is open the switch is open. Thus the physical movement of an entrance has been converted into an electrical current which, when relayed

back to the micro, sets off a visual and/or audible alarm indicating a breach of security.

Most of the home computer applications will require some method of output and this is a simple matter of interfacing the micro to a compatible printer or monitor and, thankfully, there are many of these available for all micro's.

So now you see that the home computer has a much greater potential than at first meets the eye. Not only is the VIC or 64 capable of dishing out a nasty death to those aliens the Zyglos from Planet 9, but somebody, somewhere, may even be adapting the micro to control the electric cooker, power supply or even a pop-up toaster.

# SingalongaVIC



**Not wishing to stifle new talent we listened with interest when 14 years old Andrew Tune from Sheffield told us about his Christmas Carols program for the unexpanded VIC-20. Andrew, with the appropriate surname of Tune, has produced an effective program which those of you who get a VIC for Christmas will be able to play with.**

The carols, all in three part harmony, are O Come All Ye Faithful, While Shepherds Watched, Silent Night, God Rest You Merry Gentlemen and O Little Town of Bethlehem. The three voices give the tunes some depth.

In case you are wondering why I chose the value of 5 for the volume (POKE 36878) in line 10, this is because with all three of the VIC's voices blaring out at once anything louder would tend to distort the sound. If you are using more than one voice on your VIC a much clearer sound is produced by POKEing a low volume number into 36878 and turning up the volume on the TV set itself.

For programming music you don't need any previous musical knowledge, although it does help. The first thing you need to do if you want to program music into your VIC is not to turn on the computer, but to draw a grid like the one in diagram 1. (The short lines in brackets do not actually appear on the music, but they are necessary, as you will see later.)

Next, take the music which you want to program. Look at the top left-hand corner of the actual lines of music. If there are any # (sharp) or b (flat) symbols, put them in the same places on your grid. (If there are no sharps or flats, don't worry, you're lucky!). Follow along the line or space with the sharp or flat sign on it, and place the symbol (# or b) after the letter. All other letters the same as this one will also have the same symbol then; for instance, if there is a # sign on the very top line of the music, all Fs will become F#; or say, there were b signs on the top space and the middle line on the top group of five lines all Es would become Eb and all Bs become Bb.

Now, starting at the very bottom E with value of 207, to "Middle C" (the c by middle line in brackets) with a value of 240, write in the note values (shown in table 1) alongside the letters, taking into account any sharps or flats. Next, in a

column slightly to the right of the one you have just written, do the same thing, only this time starting at the very bottom E with a value of 159 and working right up to the top C (the second space from the top) with a value of 240, remembering to take into account any sharps or flats. The next column of numbers starts at the bottom C (2nd space from the bottom) with a value

of 135, working right up to the top A, with a value of 237, not forgetting these sharps and flats. Your grid should now look something like diagram 2.

Now for the exciting part: turn on your VIC! Type in lines 10 and 20 of program 1 (these are the lines which actually play the music).

Take a look at the music again. There are usually 4 lines of notes. The bottom row of the bottom 5 lines is the bass part; the top row on the bottom 5 lines is the tenor; the bottom row of the top 5 lines is the alto, and the top row of the 5 lines is the soprano, explained better in diagram 3. (There may be 5 or 6 lines of notes in your music. If so, ignore the middle row on each group of 5 lines).

#### Note values

Type: 50 DATA (do not press "Return"). Find the first bass note (NB Music is read from left to right, like writing). Remember its position on the bottom 5 lines, and find this same position on your grid. Follow along the line or space to the first column of numbers, and type the appropriate number into the computer followed by a comma. Do the same for the tenor note, but this time look up the value in the second column. (Alto can be used instead of tenor, if you prefer, as I have done in program 2). Repeat this process for the soprano, this time look up the note in column 3.

If a note is on a short line of its own, above or below a group of 5 lines, it is shown on your grid as one of the short lines in brackets. If a note is above the bottom group of 5 lines, on a line of its own with another short line below it, it is played as the bottom line of the top group of 5. This is shown in diagram 4.

If a sharp (#) or (b) flat sign appears in the music, anywhere other than at the far left-hand side, it makes all the notes following it on the same line or space sharp or flat respectively, until the next

DIAGRAM ONE	
(_____)	A
_____	G
_____	F
_____	E
_____	D
_____	C
_____	B
_____	A
_____	G
_____	F
_____	E
_____	D
(_____)	C
_____	B
_____	A
_____	G
_____	F
_____	E
_____	D
_____	C
_____	B
_____	A
_____	G
F	E
(_____)	E

# CAROLS

NOTE:	VALUE:	NOTE:	VALUE:
C	135	G	215
C# or Db	143	G# or Ab	217
D	147	A	219
D# or Eb	151	A# or Bd	221
E	159	B	223
F	163	C	225
F# or Gb	167	C# or Db	227
G	175	D	228
G# or Ab	179	D# or Eb	229
A	183	E	231
A# or Bd	187	F	232
B	191	F# or Gb	233
C	195	G	235
C# or Db	199	G# or Ab	236
D	201	A	237
D# or Eb	203	A# or Bd	238
E	207	B	239
F	209	C	240
F# or Gb	212	C#	241

(This table can be found in the VIC-20 Personal User Guide on page 135.)

dividing line which cuts through both groups of 5 lines (bar). Another sort of sign, the natural ( ) has the same sort of effect, only this one deletes any previous sharps or flats (including those at the far left) for the rest of the bar.

## Time values

The next number to type in is for the time duration. These are as follows:  
 400 for a FILLED-IN note with a STICK (crotchet)  
 800 for an OPEN note with a STICK (minim)

1600 for an OPEN note with No STICK (semibreve)

If a small dot follows the note, this means the note is to be played half as long again. For example, a crotchet followed by a dot is worth  $400 + 200 = 600$ . If a note like a crotchet also has a tail, or two notes like crotchets are joined together with a single line, each is called a quaver and is only worth  $\frac{1}{2}$  of its normal value i.e.  $400 \text{ div by } 2 = 200$ . If a note has two tails, or two notes are joined together by a double line, each is only worth  $\frac{1}{4}$  of its normal value i.e.  $400 \text{ div by } 4 = 100$ . For every tail a

## DIAGRAM 2

(_____)	A	235
_____	G	
_____	F#	233
_____	E	231
_____	D	228
_____	C	
_____	B	240
_____	A	225
_____	G	239
_____	F#	223
_____	E	237
_____	D	219
_____	C	
_____	B	235
_____	A	215
_____	G	233
_____	F#	212
_____	E	231
_____	D	207
_____	C	
_____	B	228
_____	A	201
_____	G	225
_____	F#	195
_____	E	
_____	D	237
_____	C	191
_____	B	235
_____	A	191
_____	G	233
_____	F#	183
_____	E	
_____	D	231
_____	C	183
_____	B	228
_____	A	175
_____	G	225
_____	F#	175
_____	E	
_____	D	212
_____	C	167
_____	B	207
_____	A	159
_____	G	
_____	F#	159
_____	E	

## DIAGRAM 3



note has, its duration is halved. For instance a note with four tails would only be worth  $400 \text{ div by } 16 = 25$ .

If two notes on the same line or space are joined together with a curved line, then their values are added. I apologise if this is sounding too much like a music lesson, but there are still two things to mention: rests and repeats.

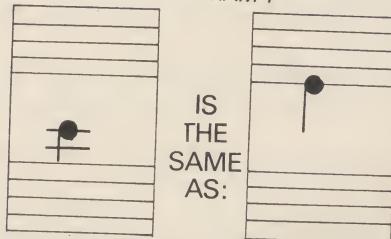
Rests are little squiggly lines and small rectangular boxes in the music. They are lengths of time when no note is played. Unless you already have knowledge of music, it is best to just judge these as to what sounds right. In the DATA statements they are represented as three noughts (with commas, of course) and then a time value, eg. 400.

Repeats: if one of the bar lines is double and has two small dots, program in the music as usual, until another double bar line is reached. Then you have to duplicate all the program lines which you typed since the first repeat line. The figures 1 or 2 with a line above part of the music which is to be repeated mean "play first time only" or "play second time only" respectively.

Now a couple of last points. You should end the music with DATA 999,0,0,0.

When you run the program it may seem too fast or too slow. You can alter the speed by experimenting with the time-loop in line 20. For example, if the music was slightly too fast you could try this: ... FORD = OTO D1\*1.2: NEXT ... The 1.2 is obviously the number to be played about with.

## DIAGRAM 4



Andrew is obviously set to be a software businessman of the future. He offers tapes of all six programs for £3. Send cheques payable to KFTune to Christmas Carols, 9 Heathfield Close, Dronfield, Sheffield S18 6RJ. Applicable to UK only.

# CAROLS

```

0 REM "O COME ALL YE" (PROGRAM ONE) (C) H. D. I.
UNE 1983
10 B=36874:T=36875:S=36876:POKE36878,5
20 READB1,T1,S1,D1:IFB1<300THENPOKEB,B1:POKE T1:POKES,S1:FORD=0TOD1:NEXT:GOT020
30 DATA235,223,215,400,235,223,215,800,235,223,201,400,235,223,201,800
40 DATA235,223,215,400,235,225,219,800,233,219,201,800
41 DATA235,223,215,400,233,219,219,400,235,215,223,400,235,215,223,800
42 DATA235,215,223,400,233,219,219,400,228,212,219,400,228,212,219,800
43 DATA225,215,225,400,228,215,223,800,228,212,219,400,228,212,219,800
44 DATA231,215,215,400,231,215,215,800,228,219,212,400,228,219,212,800
45 DATA219,219,207,400,228,219,212,400,223,215,215,400,212,212,219,400,212,212,219,800
46 DATA215,201,223,400,219,219,212,800,219,215,207,600,219,215,207,800
47 DATA228,212,201,200,228,212,201,600,200,200,200,200,200,200,200,200
48 DATA239,223,228,800,237,225,225,400,235,228,223,400,237,225,225,800,237,225,225,800,237,225,225,800
49 DATA235,228,223,800,233,228,219,400,233,212,223,400,233,212,223,800
50 DATA231,223,215,400,225,225,219,400,228,219,212,800,228,212,201,400,228,212,201,800
51 DATA,,215,400,,215,400,,212,400,,215,400
52 DATA,,219,400,,215,800,,201,400
53 DATA,215,223,400,,215,223,400,,212,219,400,,215,223,400,,215,223,800
54 DATA,219,225,400,,215,223,800,,212,219,400,,212,219,800
55 DATA235,228,223,400,,237,228,225,400,,235,228,223,400,,233,219,219,400
56 DATA231,219,215,400,,228,219,212,400,225,219,212,400,,225,219,212,800
57 DATA223,215,215,400,225,215,225,400,,228,215,223,800,228,212,219,600,,228,212,219,800
58 DATA215,215,215,200,,215,215,215,1600,,400
99 DATA999,,,
READY.

```

```

0 REM "GOD REST YOU" (PROGRAM TWO) (C) R. D. T
UNE 1983
10 POKE36878,5:B=36874:A=36875:S=36876
20 READB1,A1,S1,D1:IFB1<256THENPOKEB,B1:POKEA,A1:POKES,S1:FORD=0TO1/1.5:NEXT:D
T020
50 DATA207,,,800,.,.,207,,,400,.,.,207,,,400,.,.
51 DATA207,,,800,.,.,207,,,400,.,.,207,231,207,400,.,.
52 DATA207,231,207,400,207,235,223,400,.,.,207,235,223,400,.,.,207,233,219,400,.
,, DATA207,231,215,400,207,223,212,400,.,.,207,215,207,400,.,.,207,212,201,400,.
53 DATA207,231,215,400,207,223,212,400,.,.,207,215,207,400,.,.,207,212,201,400,.
54 DATA207,215,207,400,207,223,212,400,.,.,207,231,215,400,.,.,207,233,219,400,.
,, DATA207,235,223,800,,235,223,,207,235,223,400,.,.,207,231,207,400,.,.
55 DATA207,231,207,400,207,235,223,400,.,.,207,235,223,400,.,.,207,233,219,400,.
,, DATA207,231,215,400,207,223,212,400,.,.,207,215,207,400,.,.,207,212,201,400,.
57 DATA207,231,215,400,207,223,212,400,.,.,207,215,207,400,.,.,207,212,201,400,.
,, DATA207,215,207,400,207,223,212,400,.,.,207,231,215,400,.,.,207,233,219,400,.
59 DATA207,235,223,800,,235,223,,207,235,223,400,.,.,207,235,223,400,.,.
60 DATA219,237,225,400,219,237,219,400,.,.,219,231,223,400,.,.,219,219,225,400,.
,, DATA215,239,228,400,215,239,231,400,.,.,215,235,223,400,.,.,215,228,219,400,.
61 DATA215,239,228,400,215,239,231,400,.,.,215,235,223,400,.,.,215,228,219,400,.
,, DATA207,231,215,400,207,231,207,400,.,.,207,223,212,400,.,.,207,231,215,400,.
62 DATA207,231,215,400,207,231,207,400,.,.,207,223,212,400,.,.,207,231,215,400,.
,, DATA201,233,219,800,.,.,201,231,215,400,.,.,201,233,219,400,.,.
63 DATA215,235,223,800,.,.,215,237,225,400,.,.,215,235,223,400,.,.
64 DATA215,235,223,800,.,.,215,237,225,400,.,.,215,235,223,400,.

```

# CAROLS

```
65 DATA207,235,223,400,207,233,219,400,.,.,207,231,215,400,.,.,207,223,212,400,,
66 DATA207,231,207,800,.,.,207,231,215,200,207,231,212,200,.,.,207,231,207,400,,
67 DATA201,233,219,800,.,.,201,231,215,400,.,.,201,233,219,400,.,
68 DATA215,235,223,400,215,237,225,400,.,.,215,239,228,400,.,.,219,231,231,400,,
69 DATA223,233,223,400,223,233,219,400,.,.,225,231,215,400,.,.,228,228,212,400,,
70 DATA231,231,207,2200,.,.,999,.,
READY.
```

```
0 REM "WHILE SHEPHERDS" (PROGRAM 3) (C) A. D. T
JNE 1983
10 B=36874:T=36875:S=36876:POKE36878,5
20 READB1,T1,S1,D1:IFB1<256THENPOKEB,B1:POKET,T1:POKES,S1:FORD=0TOD1/2:NEXT:GOTO
20
50 DATA232,219,209,800,.,.,232,225,219,1200,.,.,232,225,219,400,.,
51 DATA225,225,215,800,.,.,228,219,209,800,.,
52 DATA221,228,221,800,.,.,221,228,221,800,.,.,232,225,219,800,.,.,225,225,215,8
00,.,
53 DATA232,225,219,800,.,.,231,225,225,800,.,.,233,228,225,800,.,.,233,228,223,8
00,.,
54 DATA225,225,225,2400,.,.,232,225,219,800,.,
55 DATA238,221,228,1200,.,.,232,219,225,400,.,.,228,221,221,800,.,.,232,225,219,
800,.,
56 DATA225,225,215,800,.,.,228,219,209,800,.,.,219,219,207,800,.,.,232,219,219,8
00,.,
57 DATA225,225,215,800,.,.,228,219,209,800,.,.,221,221,209,800,.,.,225,215,207,8
00,.,
58 DATA232,219,209,2400,.,.,999,.,
READY.
```

```
0 REM "SILENT NIGHT" (PROGRAM FOUR) (C) A. D. T
JNE 1983
10 B=36874:T=36875:S=36876:POKE36878,5
20 READB1,T1,S1,D1:IFB1<256THENPOKEB,B1:POKET,T1:POKES,S1:FORD=0TOD1:NEXT:GOT020
50 DATA225,225,215,600,225,225,219,200,.,.,223,215,215,400,.,.,225,215,207,1200,
.,
51 DATA225,225,215,600,.,.,225,225,219,200,.,.,223,215,215,400,.,.,225,215,207,1
200,.,
52 DATA235,223,228,600,235,225,228,200,.,.,235,223,228,400,.,.,235,228,223,600
53 DATA235,228,219,200,232,215,223,400,.,
54 DATA231,215,225,600,232,219,225,200,.,.,231,215,225,400,.,.,225,225,215,1200,
.,
55 DATA232,225,219,600,.,.,232,225,219,200,.,.,232,225,219,400,.,.,237,219,225,6
00
56 DATA235,219,223,200,.,.,232,225,219,400,.,
57 DATA231,225,215,600,232,225,219,200,.,.,231,225,215,400,.,.,225,215,207,600
58 DATA225,219,207,200,225,215,207,400,.,
59 DATA232,219,219,600,.,.,232,219,219,200,.,.,231,219,219,400,.,
60 DATA228,209,225,600,228,209,223,200,.,.,225,219,219,400,.,
61 DATA223,228,215,600,219,228,219,200,.,.,223,215,215,400,.,.,225,215,207,1200,
.,
62 DATA223,215,228,600,.,.,225,215,228,200,.,.,223,215,228,400,.,.,235,223,232,6
00,.,
63 DATA235,223,228,200,.,.,232,228,223,400,.,.
```

# CAROLS

```

64 DATA231,225,225,600,232,225,225,200,231,215,225,400,225,225,231,1200,,
65 DATA215,207,225,600,215,207,215,200,215,219,207,400,215,201,215,6
00,,
66 DATA215,201,209,200,215,209,201,400,225,207,195,2400,999,,
READY.

```

```

0 REM "O LITTLE TOWN" (PROGRAM FIVE) (C) A. D. T
UNE 1983
10 POKE36878,5:B=36874:T=36875:S=36876
20 READB1,T1,S1,D1:IFB1<256THENPOKEB,B1:POKET,T1:POKES,S1:FORD=0TOD1/1.95:NEXT:G
OT020
50 DATA233,219,201,800,235,223,215,800,240,225,215,800,,
51 DATA239,228,215,800,237,225,219,800,,
52 DATA235,228,223,400,235,228,219,400,231,215,223,400,231,215,225,400,,
53 DATA228,219,228,800,231,215,223,800,,
54 DATA219,225,225,800,223,228,223,400,223,228,215,400,,
55 DATA225,231,219,800,228,228,219,400,228,225,219,400,235,223,215,2400,
,,200
56 DATA233,219,201,800,235,223,215,800,240,225,215,800,,
57 DATA239,228,215,800,237,225,219,800,,
58 DATA235,228,223,400,235,228,219,400,231,215,223,400,231,215,225,400,,
59 DATA228,219,228,800,231,215,223,800,,
60 DATA219,225,225,800,223,228,223,400,223,228,215,400,,
61 DATA225,231,219,800,228,228,219,400,228,225,219,400,235,223,215,2400,
,,200
62 DATA231,223,215,400,231,223,223,400,223,223,228,1200,225,215,231,400,
,,,
63 DATA228,228,228,400,228,228,225,400,231,228,223,400,233,225,219,400,,
64 DATA235,223,215,400,235,223,219,400,231,215,223,400,231,215,225,400,,
65 DATA228,219,228,800,228,212,201,400,225,212,201,400,,
66 DATA223,215,215,800,215,215,223,800,225,207,219,400,225,212,219,400,
,,,
67 DATA231,215,215,800,228,212,201,2400,,
68 DATA231,215,201,400,233,219,201,400,235,223,215,800,240,225,215,800,,
,,,
69 DATA239,228,215,800,237,225,219,800,,
70 DATA235,228,223,400,235,228,219,400,231,215,223,400,231,215,225,400,,
71 DATA228,219,228,800,231,215,223,800,,
72 DATA219,225,225,800,223,228,223,400,231,223,215,400,,
73 DATA228,228,219,800,228,228,219,400,228,225,219,400,215,223,215,3200,
,,,
999 DATA999,,
READY.

```

```

0 REM "HARK THE HERALD" (PROGRAM SIX) (C) A. D. T
UNE 1983
10 B=36874:T=36875:S=36876:POKE36878,5
20 READB1,T1,S1,D1:IFB1<300THENPOKEB,B1:POKET,T1:POKES,S1:FORD=0TOD1:NEXT:GOT020
50 DATA235,223,201,400,235,223,215,400,235,223,215,600,228,219,212,2
00,,
51 DATA223,215,215,400,215,228,223,400,228,228,223,400,228,228,219,400,
,,,
52 DATA223,228,228,400,223,228,228,400,225,231,228,400,228,225,231,22
8,200
53 DATA225,231,225,200,228,228,223,400,228,228,219,400,215,228,223,8
00,,
54 DATA235,223,201,400,235,223,215,400,235,223,215,600,228,219,212,2

```

# CAROLS

```
00,///
55 DATA231,215,215,400,,,,228,228,223,400,,,,226,231,223,400,219,231,219,400,,
//  
56 DATA223,228,228,400,,,,226,231,219,400,,,,228,219,219,400,212,219,219,200,2  
12,///
57 DATA212,219,212,200,,,,215,223,212,400,,,,219,215,207,400,,,,228,212,201,8  
00,///
58 DATA,228,228,400,,,,228,228,400,,,,228,228,400,,,,239,228,215,400,///
59 DATA231,228,225,400,,,,235,228,223,400,,,,228,228,223,400,228,228,219,400,,
//  
60 DATA,228,228,400,,,,228,228,400,,,,228,228,400,,,,239,228,215,400,///
61 DATA231,228,225,400,,,,235,228,223,400,,,,228,228,223,400,228,228,219,400,,
//  
62 DATA225,231,231,400,,,,225,231,231,400,,,,225,231,231,400,,,,228,232,228,4  
00,///
63 DATA231,231,225,400,,,,231,228,223,400,,,,237,225,225,600,///
64 DATA,228,219,400,,,,240,228,223,200,240,228,225,200,,,,239,228,228,600,///
65 DATA235,223,215,200,,,,228,223,215,400,,,,228,228,219,400,,,,235,228,223,8  
00,///
66 DATA240,231,231,600,,,,240,231,231,200,,,,240,231,231,400,,,,239,228,228,4  
00,///
67 DATA237,225,225,400,,,,236,223,223,400,,,,237,225,225,400,235,225,225,400,,
//  
68 DATA233,228,219,400,,,,240,228,223,200,240,228,225,200,,,,239,228,228,400  
69 DATA235,228,228,200,235,223,215,200,,,,228,223,215,400,,,,228,225,219,400,,
//  
70 DATA235,223,215,800,,,,999,///
READY.
```

# BYTEWELL

## 64 SOFTWARE

Kong	7.95	The Hobbit	14.95
3D Time Trek	7.95	Hungry Horace	5.95
Bat Attack	7.95	3 Deep Space	7.95
Brands	7.95	Purple Turtles	7.95
Grandmaster chess	17.95	Quintic Warrior	7.95
Egbert	7.50	Falcon Patrol	6.95
The Fabulous Wanda	7.95	Robin to the Rescue	7.95
Star Trek	7.00	Radar Rat Race Cartridge	9.99
Panic	7.00	Everest Ascent	6.50
Siren City	7.00	Ship of the Line	6.50
Defenda	7.00	Vultures	7.00
Arcadia	5.50	Galaxions	9.00

*Please make cheques/P.O.'s payable to  
BYTEWELL.*

*Overseas Orders please include 60p P&P.  
Bytewell, 203 Court Road, Barry,  
S. Glamorgan CF6 7EW. Telephone  
(0446) 742491*

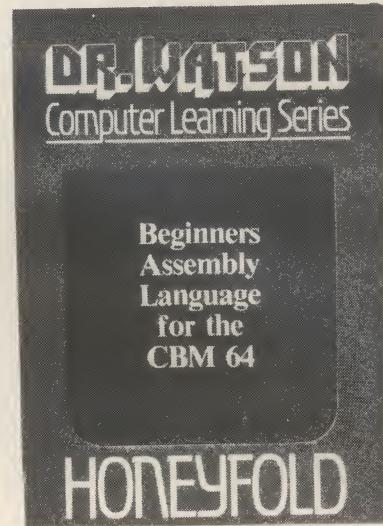
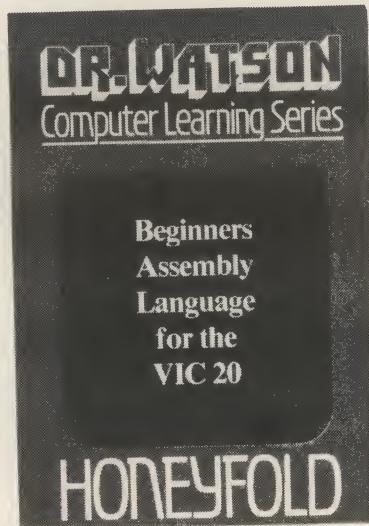
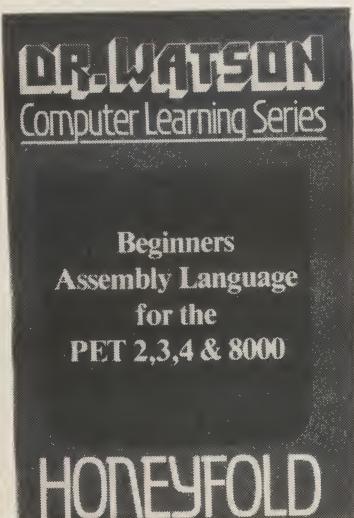
AND LOTS MORE  
SEND SAE FOR FULL LIST.

COMPLETE

# BEGINNERS 6502/6510 COURSE

IN

## ASSEMBLY LANGUAGE PROGRAMMING



Each tape contains a complete 6502/6510 Assembler plus a BIN/BCD/Hexadecimal tutor.

This self paced course takes you from the absolute beginner in Assembly language, through the whole 6502/6510 instruction set and, as the press reviews have said, these are the **FIRST** books really written for the beginner.

From the earliest chapters your programs will run as the book is written to suit the purpose-designed assembler. Just to nurse you through these early stages the tape contains a complete binary, binary-coded decimal and hexadecimal tutor.

The chapters will tell you about:

- How to get started.
- Conditional and unconditional jumps.
- Setting the flags.
- Screen displays.
- Timing things.
- Mathematical operations.
- Labels, memory labels and macros.
- Saving loading and printing machine-code programs.
- Interrupts, overflow and break flags.
- The USR command.
- Floating point numbers.
- The 6502/6510 instruction set.
- and lots more.

Just to check that you are on the right road, each chapter has numerous exercises, all of which are explained in full – at the back.

Each book is a bargain with a complete 6502/6510 reference text, a full assembler and a book that the beginner will understand.

Available from all good computer and bookshops or direct from Honeyfold.

## BOOK AND TAPE COURSE FOR BEGINNERS

**14.95**  
inc p&p

**"The existing books are far surpassed by Dr Watson"** D. Bolton, Vic Computing.

**"There aren't easier ways of learning how your computer does it"** K. Dallas, P.C.N.

# HONEYFOLD

Honeyfold Software Limited  
Standfast House, Bath Place,  
High Street, Barnet, London.  
Tel: 01-441-4130

# Best of British words

**There are many word processors on the market. Since our business at Commodore Computing International is all to do with words (we use word processors all the time) we feel pretty well qualified to judge a good software package when we see one. We've seen quite a few but we were still impressed by this one from Viza Software.**

At long last, here is a word-processor for the 64 that is one step ahead of the vast multitude of other word-processors. Actually Vizawrite 64, produced by Viza Software, is more than just a word-processor because there is also an integrated spelling checker called Vizaspell 64 that comes on both disk and cartridge.

Both are new British products that incorporate the very latest in word-processing design techniques. Vizaspell 64 has a massive dictionary of 30,000 English words and one of the features (well, more of a frill really) of Vizawrite 64 is the ability to change the colour of the lettering, background and border, all to make the screen more relaxing to the eye of the operator. However, when changing the colour, the user can get some very garish contrasts.

Vizawrite is written in 6502 Machine Code and the disk is formatted to be compatible with the 1541 and 4040 disk drive, although an 8050 formatted version is available. This might be a little bit restrictive to the use of the system, but as far as printing is concerned there is very little limitation. Printers supported are the VIC 1525, Epson, Qume, Diablo, Spinwriter, Flowriter and the Triumph Adler TRD170 recommended by its price of £700 if nothing else.

The protocol used to access the printer is provided by an IEEE Serial or Parallel cable.

Loading from disk, the first 'screen' appears while the program is still being loaded. The picture itself sets the standard for the following program, because this is a good use of the 64's graphic capabilities and keeps the user entertained while the rest of the program is loading. Happily, the standards set by this picture are matched if not surpassed.

Like most other word-processors today, this is a menu controlled program which makes good use of the function keys. The main menu which exercises control is the

select activity which creates a new file or recalls an old one, provides the user with a disk directory and DOS commands.

Before any information can be input, there are several requirements that have to be met to enable the word-processor to be able to format the text. The basic instructions that are needed simply inform the system of the left and right margins. The necessary information can appear at any position on the screen and even in the middle of text. Upon the creation of a document, this line will appear at the head of page one and the left margin is set at four, the right at 74. This latter margin can be extended up to 240 simply by inserting spaces.

Thus having accomplished this satisfactorily, text will now be formatted as soon as it is entered. Whereas it is beyond the capabilities of Wordpro and Easy Script to perform formatting as soon as the text is entered with the result that they often leave incomplete words at the end of the screen line, using Vizawrite, text is formatted on screen.

But 240 columns do not appear on the screen and what happens once the margins have been reached? Well, as soon as text has gone off the normal screen, side-scrolling comes into effect which means that more text can be entered and if necessary 'word wrapping' comes into operation, ie if a word does not completely fit on one line it will automatically be put on the next. It is possible to see what the formatted text will look like once it has been printed by issuing the width command which will set the right margin back to column 74, this being one of the many very useful commands.

Many of these commands are standard features but, apart from the word-processing commands, there are several display characters which are not standard features but probably soon will be when other producers take note of this product. These are the format symbols and are

accessed by the function keys. Using these it is possible to delete text, insert text, move cursors, set the margins and go back and forth from page to page and screen to screen.

Word-processor commands are used to perform a major operation such as moving a block of text or merging documents. These word-processor commands are initiated by the CBM key which prompts the question "Which command?". This is then followed by an initial associated with the required command. For instance, c means copy text from one part of the document to another, p means print the document and r means replace a single phrase with another.

It is highly likely that the user may wish to use a variety of printing techniques, for instance underlining or printing in heavy type. All this can be done using a separate set of format symbols and include the ability to send ASCII code to the printer. ASCII has been incorporated because many printers have additional features that can be selected by sending two or more ASCII codes.

With Vizawrite 64, the numbers 0 to 9 act as the format symbols can be used to send single codes to the printer as long as the correct ASCII code has been assigned previously. This is also done on the format line where the numbers 0 to 9 followed by the assigned ASCII code as in the format 0 = 52.

Printing any sort of document is a fairly complicated process, mainly because Viza Software have included options for just about anything possible. Form feeding cause the printer to space up to the next top of form position and this is not usually allowed for on CBM printers because CBM have a different option called line feeding which performs the same sort of operation. Before anything can be out-put there are several parameters that have to be set such as number of lines per page and whether the stationery used is single sheets or continuous feed.

**64  
OWNERS**

# SOFTCHIP NOW AVAILABLE

£34.95

The highly successful SOFTCHIP is now available on 8-K cartridge for the Commodore 64 at an amazing value-for-money price of ONLY £34.95 including V.A.T. and p&p for your choice of 7100 bytes.

*Harness our machine-code from your Basic programs using simple Basic commands.*

**MIX ANY COMBINATION OF 7100 BYTES WORTH OF COMMANDS  
FROM THE FOLLOWING LIST :**

#### Program editing commands :

AUTO	90	Provides automatic line numbering
DELETE	70	Deletes a given range of program lines.
DUMP	170	Outputs the names and values of all current scalar variables
FIND	200	Lists all lines in which a given character string appears.
FUNC	400	Permits use of C64 function keys.
HELP	160	Prints line in which program error occurred.
LINES	50	Calculates the number of lines in a program.
MERGE	400	Merges program from tape or disk into the current program
RENU	930	Renumerates a program, altering all GOTO's, THEN's, etc.
REPLACE	490	Replaces all occurrences of one character string with another
RESCUE	40	Recover a program accidentally 'NEW'ed.
SHRINK	180	Removes all unnecessary spaces and 'REM's from a program
STATS	120	Outputs the number of statements in the current program
TRACE	110	Displays the last six line numbers at the top-right screen
VAR	390	Outputs the names of all variables referred to in a program.

#### Disk commands :

BASIC4	1970	Comprising APPEND, BACKUP, CATALOG, COLLECT, CONCAT, COPY, DCLOSE, DIRECTORY, DLOAD, DOPEN, DSAVE, HEADER, RECORD, RENAME, SCRATCH.
DERROR	150	Reads the disk error channel.
DREAD	100	Reads data from disk without input restrictions.
DSEARCH	330	Searches a disk relative-file for a given string or pattern.
TIMEOUT	30	Sets the time-out condition for the IEEE interface.

#### New BASIC commands :

BLOAD	40	Loads in a block of memory without affecting BASIC execution.
BORDER	100	Draws a border around the edge of the screen.
BSAVE	120	Saves the memory area between two given addresses.
CALL	80	Enters a machine-code subroutine with given ACC, X-, Y-reg.
CIF, CEND, 220		Four commands which provide facilities for structured BASIC largely eliminating the need for GOTO command.
ELIF, ELSE		
CLOCK	250	Continually displays the time at a given screen position.
CURSOR	30	Places the cursor at position x, y on the screen.
DATIN	690	Foolproof input routine for dates with full error detection.
DISABLE	50	Disables the run-stop key.
DISP	140	Displays a prompting or warning message on a given line.
EXEC	140	Executes a string as a BASIC command.
GENIN	700	General foolproof input routine with selected key disablement
GSUB	110	Performs a GOSUB to a given labelled line.
GTO	90	Performs a GOTO as above.
INVERT	160	Turns a string back to front.
LWIND	250	Loads a screen display from a compressed format disk file
MOVE	130	Moves a block of memory to another position in RAM.
NUMIN	740	Foolproof input routine for amounts of money.
ON	50	Branches to program line corresponding to key pressed.
PLOT	170	Plots a double-density point on the screen.
POP	30	Removes the last subroutine return address from the stack.
PRINT	130	Adds routine to automatically right-justify amounts of money
PUSH	60	Pushes a return address onto the stack.
RESET	170	Resets a double-density point on the screen.
RESTORE	20	Restores DATA back to a given line number.

ROUT/PER	240	Allows user-defined functions with multiple arguments.
SCAN	190	Scans a string for the next occurrence of a given character.
SEARCH	270	Searches an array for a given string or pattern.
SORT	760	Sorts any one-dimensional array (& tags another array along)
SWAP	440	Loads in another program, retaining all variables.
SWIND	220	Saves the contents of the screen in a compressed disk file.
WPOKE	50	Pokes two memory locations in hi-lo 6502 order.

#### New functions [like SIN]

AVG	140	Calculates the average of the elements in a numeric array.
BLANK	40	Tests a string, returns true if the string is blank.
COLS	50	Returns the appropriate colour character for colours 0 to 15.
DATES	160	Gives a date-string corresponding to a date-number.
DEC	80	Gives the decimal equivalent of a hexadecimal number.
FACT	60	Provides the factorial function.
GAMMA	90	Provides the gamma function.
HEX\$	90	Gives the hexadecimal equivalent of a decimal number.
HITBACK	30	Returns true if a sprite has collided with the background.
HITSPR	30	Returns true if a sprite has collided with another sprite.
MAX	120	Returns the maximal element of an array.
MIN	120	Returns the minimal element of an array.
MOD	40	Returns the remainder of one number modulus another.
NORM	160	Provides the normal distribution area function.
PADS	90	Pads a string with spaces.
QUMES	70	Assists high-resolution plotting on QUME Sprint 5 printer.
SHRS\$	260	Gives the compressed form of a number for compact storage.
SPCS	30	Gives a string of spaces of given length.
STICK	40	Returns position of joystick.
SUM	130	Returns the sum of elements of an array.
WPEEK	40	Peeks a two byte address.
XPD	220	Decompresses a number.

#### Printer commands :

PCTRL	100	Sets the device number and characteristics of the printer.
PRINT #	280	Modifies all printer-output according to PCTRL.
SCOPY	340	Copies the screen to the printer.

#### Other commands :

COMS	460	Prints lists of commands on the cartridge.
DEFINE	220	Allows the user to define his own new commands.
DESIGN	1510	Gives multi-colour sprite editor.
EDIT	70	Adds 'delete-forwards' function.
ERROR	150	Intercepts program errors and branches to specified line.
IRO	60	Restores normal use of interrupts
KILL	20	Turns off SOFTCHIP commands
MON	790	Adds the standard machine-code monitor.
NOKEY	120	Makes selected keys inoperative.
REPEAT	30	Adds repeat-key function on all keys.
SPRITE	240	Sets position, colour and mode of sprite

#### HERE'S WHAT YOU GET !

- ★ Your choice of commands
- ★ Swift despatch of order
- ★ Proven routines now indispensable to PET softchip owners
- ★ Business commands (if selected) used as standard in top-selling professional programs
- ★ Free demonstration cassette of programs featuring Softchip commands
- ★ 50+ page fully comprehensive manual - easy for beginners yet detailed enough for experts
- ★ Compatible with DAMS IEEE interface and Interpod

£34.95

Telephone our experts  
for full free details.  
Softchip still available  
on PET's, write for details

#### HERE'S HOW TO ORDER :

- 1 Choose around 7100 bytes from the list above : the number of bytes is beside the name
- 2 List your commands in order of preference - this is important as our numbers of bytes are only approximate
- 3 Cheques with order please : or order by telephone, quoting your official order number, Barclaycard or Access number for immediate despatch

**Whitby Computers Ltd**

8. Chubb Hill Road, Whitby, North Yorkshire  
YO21 1JU Tel : 0947-604966 or 604968

## SOFTWARE REVIEW

Global printing is possible by linking all the documents to be printed together as in normal text processing. There are a couple of other options that can be used in conjunction with global printing. Fill means that documents can be filled by merging text from different sources and when this entry contains a global instruction the file entry must contain the name of the next document to be printed.

Once all the necessary parameters have been set, F1 will set the printing operation

in motion. While each document is being printed, the current page being printed being visible on the screen at the same time. Pressing the stop key halts the printing.

To round off the whole system, there are helpful prompts and messages in abundance and should the user get stuck there is a document supplied with the system that contains a list of commands and useful information.

Part of Viza Software's back-up service

is a registration service which costs £3 per year and entitles the member to periodic newsletters containing further information about Vizawrite products, applications and up-dates.

The cost of the disk based version is £79.35 whilst the cartridge version costs an extra 60 pence. For users of the 64 who want a good wordpro and are not too bothered about the price this is definitely the one to buy.

# Supersofts Mikro 64

More and more people are starting to program using machine code or assembly language because of the speed that these languages run at. When assembly language is used in conjunction with the 64, a great many possibilities are opened up as to what to write and where to put it.

I have been using the Commodore Assembler Development System for the 64 for some time and find it much easier to use labels and assemble it rather than to write it using a monitor and have to keep going back to fill in branch locations etc.

Now Supersoft have produced an assembler on cartridge for the 64. The cartridge plus a manual on how to use it costs £50.00 plus VAT.

### Getting Started.

All that is needed to start up the assembler is to plug the cartridge into the cartridge port and power up the machine. From there you are ready to use the assembler.

### Writing Source Code.

The writing of the source code is as simple as writing a Basic program as long as you know machine code. The operations are entered as a Basic program with line numbers and all branches must go to a label.

The length of the labels is not restricted to 6 characters as is in the Commodore Assembler - I tried a label that was 26 characters long and it worked perfectly.

When the source code has been written, it can be saved on disk or tape just

like a normal Basic program and assembled. The file to be assembled must be in memory at the time of assembling, but if you want your program to be several files long you may include a directive at the end of one file to another one that is stored on disk or cassette.

The assembling is done in three passes, and after the third pass, the start and end addresses of the code are displayed and the program has been loaded into memory.

### Added Commands

There are a fair few commands added to improve the ease of entering source code. Each of the commands have been tokenised so that only the first letter followed by the shifted second letter need be typed. The obvious ones being AUTO, DELETE, FORMAT (which lists your source code in an understandable format), and FIND. There are other useful commands available such as NUMBER which displays a number in one of four different formats (decimal, hexadecimal, octal, or binary) in all four formats. This will also work with the variables from the source code.

TABLE displays the full label table after the program has been assembled. DISASSEMBLE is used to disassemble a machine code routine to the screen or the printer.

The final and most important command available is the command ASSEMBLE which assembles the program.

### Monitor

There is also a version of TINY-MON available which is entered by operating a break or typing TIM. This gives the user a monitor with the usual commands of Memory display, Disassemble, Save, Load, Goto (execute machine code), Hunt memory for value(s), Transfer memory, and exit the monitor back to Basic.

### Use of Memory

Because of the fact that a true assembler allows labels, memory is required to store the labels in. This memory is from \$A000 to \$CF00 and \$CF00 to \$CFF is a workspace for data storage. This is the only problem as sometimes (more often than not) I use the area \$C000 to \$CFFF for my own programs. This is not a problem when the program is short as the labels are stored from the bottom up and so may not protrude into the \$C000 area but on larger programs this area cannot be used.

### Conclusions

At a price of £50.00 plus VAT, I think that it is well worth the money but the Commodore's own assembler is a bit more versatile if a bit slower. I would still invest in a copy of MIKRO 64 anyway because it has some very good points and it supports cassette files which the Commodore Assembler does not.

Configuration: Commodore 64 with disk or cassette.

Contact: Supersoft, Winchester House, Canning Road, Wealdstone, Harrow, Middlesex HA3 7SJ. Telephone: 01-861 1166.

Home  
Computer  
Centre



29 Millcroft, Crosby, Liverpool L23 9XJ  
Tel. 051-727 8050

VIC 20 and CBM 64 are reg'd trade marks  
Commodore Business Machines

**SPECIAL  
OFFER**

ASTERFRET TRADING LTD. INCORPORATES  
HOME COMPUTER CENTRE

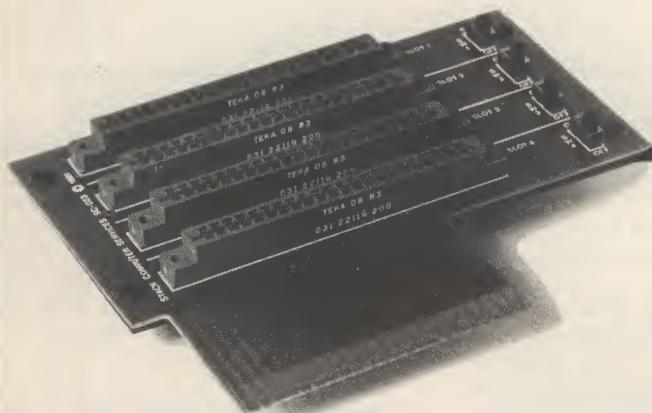
**RAM PACKS**

VIC 20 16K STANDARD  
VIC 20 16K SWITCHABLE  
VIC 20 32K SWITCHABLE

— £27.95  
— £35.95  
— £49.95

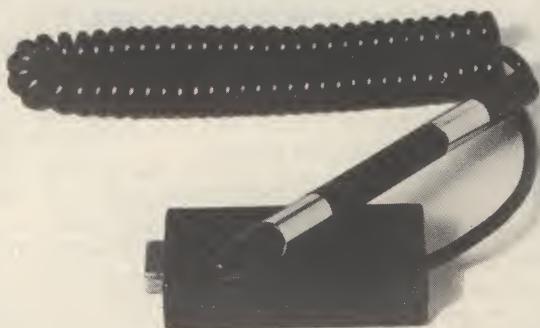


**16K STANDARD  
£27.95**



**MOTHERBOARDS**

VIC 20 4 SLOT SWITCHABLE — £28.95  
CBM 64 4 SLOT SWITCHABLE — £29.95



**LIGHT PENS**

BBC  
CBM 64  
VIC 20

+ FREE GAME  
+ FREE GAME  
+ FREE GAME

— £28.75  
— £28.75  
— £28.75

Please allow up to 21 days for delivery. All prices include V.A.T., postage and packing.

If you wish to be added to our mailing list,  
please tick the appropriate box

- VIC 20
- CMB 64
- BBC
- Lynx
- Dragon 32
- ZX Spectrum
- Electron

**PLEASE SEND ME**

Qty

- 16K Std. Ram Pack
- 16K Switchable Ram Pack
- 32K Switchable Ram Pack
- VIC 20 4 Slot Motherboard
- CBM 64 4 Slot Motherboard
- VIC 20 Light Pen
- CBM 64 Light Pen
- BBC Light Pen

Name \_\_\_\_\_  
Address \_\_\_\_\_



I enclose Cheque/PO for £ \_\_\_\_\_

Home  
Computer  
Centre



# Complete music system

When you next hear the voice of a Colleen it might not be the dulcet tones of a beautiful girl from the Emerald Isle but the versatile tones of a new music system from Jim Molloy.



One day in the distant future, audiences all over the world could be listening to the London Philharmonic Orchestra playing not the usual wind and string instruments but the VIC and the 64!

A combination of hardware and software that should add a whistle to the voice of any 64 is soon to come out from Jim Molloy and this system is so versatile that it will even allow you to put the resulting tunes through your stereo system.

The system is called Colleen and is made up of a 64, a 1541 single disc drive and the Casiotone MT-11 keyboard. However it is not restricted to the 64 or the keyboard because it is machine independent. Whereas using a different micro is simply a matter of getting the correct interface cable, a different keyboard presents at least one major problem. The MT-11 is hooked up to the interface box that provides a pulse count provided by a simple timer. This means that the pulses are counted by the space between the time the note was recorded and the time the note dies away. They have also designed a program that calculates the numbers so that a note can thus be recognised by the user not only by the sound that is produced but also in a digital form.

The original interface box that was used worked but it was felt that the results were not satisfactory because of the time it took between depressing the note on the keyboard and the system actually recognising the note. Part of the problem was overcome with the design of a second interface which reduced the time to five milliseconds and the tone of the note is actually sampled five times per second. The frequency of the note is measured in hertz and the second major job of the interface was to convert this frequency as the note built up into a digital format to be shown on the screen built in to the interface box. The frequency rapidly builds up, stabilises and falls away and it is at the point of stabilisation that the true frequency is found and held.

This is all to do with musical wave forms. Using this method of measuring the frequency per note, the time lag between the release of the key and the first sample is practically nil. The crucial factor in developing the system was the time factor. The second part of the problem has, at the time of going to press, yet to be overcome.

This requires the original BASIC program to be converted to Machine Code and because the demonstration program is written in BASIC this is a major reason why it was quite slow.

The demonstration program is a routine written in BASIC at the moment and so it takes quite a long time for the note to be recorded and appear on screen.

The screen display is a simple music stave with a simple tune written into it. This tune is represented by notes on screen and the note pressed by the user is eventually represented on screen. The aim here is to get the user to replicate the tune. If a wrong note is recorded, this will appear above the correct note so, in effect, two sets of notes are displayed – those that are correct and those that are wrong.

This demonstration program would be an ideal aid for teaching the younger child because it means that the user can put the notes on screen just as they would be written on a normal musical score.

Up to this point, all the user has managed to do is use the keyboard to put the notes in. Once the information has been accepted, the tune (no matter how good or bad it is at this stage) can be dumped to disc and played back at whatever speed you want. The first program that will be used will be a demonstration program similar to the one described previously. This set up will be accompanied by the interface lead between the keyboard and the computer as well as a couple of application programs



## EPROM PROGRAMMER MK3

This advanced version of our Mk.2 Programmer will program the popular industry standard 2516, 2716, 2532, 2732, 2564, 2764, and 27128 EPROMS. Disk-based software with all the essential functions for fast and reliable EPROM programming. 14 functions including Check-Empty, Program, Verify, etc; plus 6502 Disk Assembler and Assembler Hex-File loading (CBM or JCL Assemblers). With built in power supply and new custom case, this is the Programmer Commodore use at Slough! Price £299+VAT including 2716 personality card.

## IEEE BUS-ADAPTOR FOR VIC 20 AND CBM 64

A superior adaptor at a reasonable price. This brand-new item allows you to use standard CBM/PET IEEE disk drives and printers with your VIC or 64. Many advanced features including:

- ★ MINI-DOS support
- ★ Batch file loading
- ★ Gold-plated edge connector for long term reliability
- ★ Selectable default device number for load/save
- ★ Multi-user bus sharing and simultaneous use of the serial bus.

Supplied with instructions detailing these features plus many more. Price £59+VAT.

**JCL SOFTWARE**  
47 London Road, Southborough,  
Tunbridge Wells, Kent

## JCL 700 WORKSHOP

Superb NEW cartridge for the CBM 700. Your programs will become faster, more reliable, smaller and much easier to write!

- ★ 10 TOOLKIT-type programming aids.
- ★ Bi-directional screen scrolling.
- ★ Enhanced BASIC with 39 new KEYWORDS.
- ★ Comprehensive data input systems with efficient File Interfacing.
- ★ DOS-SUPPORT available all the time.
- ★ ASCII-editor for text and assembler files.
- ★ Elementary word processing facilities.
- ★ BANK-SYS, Kernel in every bank.
- ★ Design and add your own BASIC extensions.
- ★ Extra RAM in system bank.
- ★ Comprehensive manual.

Available now, price £120.00 + VAT.

## BUSINESS ROM

The BUSINESS ROM for 4000/8000 Commodore Machines adds 25 additional keywords to BASIC. Super screen management & input systems coupled with efficient easy-to-use relative file handling . . . and more. Includes DOS-support. Used by many major UK companies who require the best! Price £80.00 + VAT.

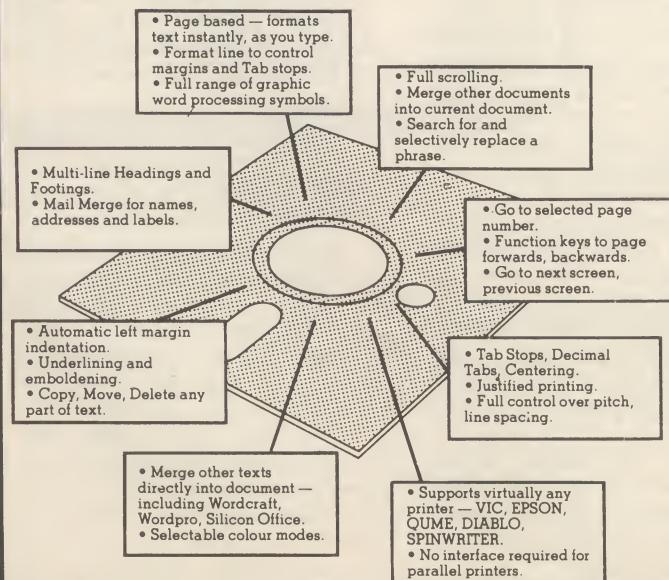
## ROM PAGER

ROM PAGER boards for 3000/4000/8000 machines give 8 extra expansion sockets for ROMs or EPROMS, easy to fit, leaves user port free. Price £45.00 + VAT.

Phone 0892-27454  
for data-sheets or  
contact your nearest  
Commodore dealer.

# GET MORE FROM YOUR 64. WITH VIZAWRITE 64.

### VIZAWRITE 64 – SPECIFICATIONS



ONLY  
**£69** plus VAT

## THE PERSONAL WORD PROCESSOR

Vizawrite 64 is a high performance, low-cost word processor designed especially for the Commodore 64 computer. Vizawrite 64 takes full advantage of the colour, graphics and memory capabilities of the computer to bring you the power and style of a dedicated word processor.

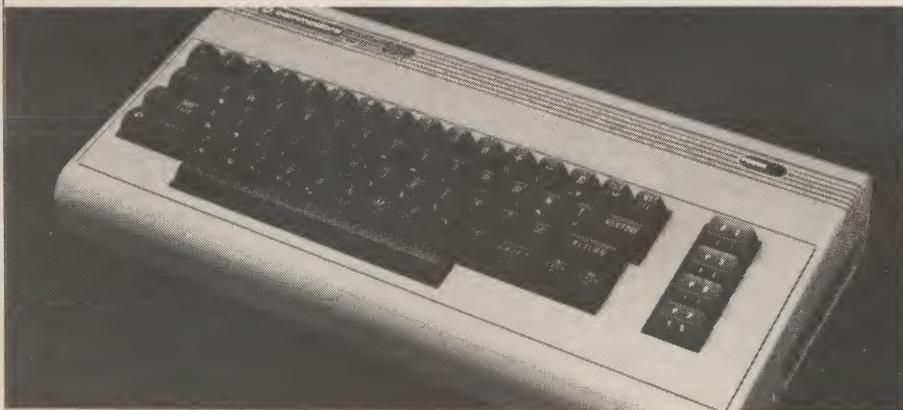
Serious word processor users expect their word processor to format their text as they type, Vizawrite 64 does this instantly. Tabs, indentation, centering are all clearly visible and easily altered, so you know exactly the format of your text all the time.

Vizawrite 64 is a disk-based word processing program – it is available NOW from your local Commodore dealer or direct from Viza Software. It costs just £69.00 plus VAT (£79.35).

**VIZA SOFTWARE**,  
9 MANSION ROW, BROMPTON,  
GILLINGHAM, KENT ME7 5SE.  
TEL: MEDWAY (0634) 813780.



SOFTWARE



to give the user some idea of how the package can be used to its best advantage.

Other planned application programs will enable the system to mix the music produced by say a harp and a violin, text editing of music and a play along tune with the micro.

At the moment it is proposed that the first unit will be powered by batteries although there will also be a power supply unit which can be adapted for use with the unit. This will be available directly from Jim Molloy.

The software will be available on cassette or disc although at the moment

the firm details of how information is to be downloaded have not yet been worked out. One of the reasons for this is dependant on the actual equipment used. This means that the actual unit specifications may be subject to change because the equipment has got to be set to like anything.

The problem with using different keyboards lies in the actual quality of the reproduction of the note because the zero reference is set individually for each keyboard. Once this reference has been set, it should be possible for the system to accept anything so long as it is above the threshold levels. If the manufacturers are

made aware of the keyboard the system is being used with they can specify the settings, saving the user an awful lot of fiddling about. However, they do suggest that the user sets it to the organ setting as this produces the most stable note.

Out of all the keyboards on the market at the moment, why did the manufacturers choose the Casiotone MT-11? Rather similar in size to the 64, the Casiotone, in the words of Jim Molloy, the musical brain behind the product, "the keys themselves have a very nice feel to them, requiring only the softest of touches." The range of instrumental sounds that the keyboard is capable of producing was also an important factor.

Along with several possible settings for the volume, the keyboard is also switch selectable to vibrato which produces a vibrating effect or sustain which produces the effect of 'holding' a note. The instruments that can be electronically reproduced are piano, pipe organ, violin, accordian, harp, clarinet, organ and electric piano. In fact using the principle of overlaying the music adopted by recording studios where the basic track is recorded first, it is possible to produce a piece of music that seems to involve a whole orchestra.

# A motherboard for the VIC-20

Motherboards are most commonly found inside the micro and once they are installed very little can be done with them apart from adding or removing the necessary chip every now and then. Stack have produced a motherboard which is attached to the outside of the micro.

This particular motherboard is for the VIC 20 and is connected simply by plugging into the memory expansion port at the back of the VIC. On the board there are four expansion connectors for cartridges. To prevent damage to the board

and the cartridge, the cartridges should be plugged in with labels facing the VIC.

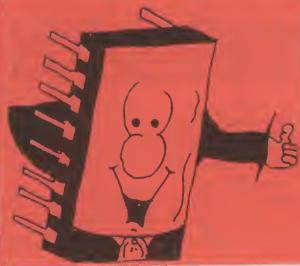
### On/off switches

Each of these expansion connectors has its own on/off switch. This is designed so that the user can select individual cartridges on powering up the micro without having to remove cartridges that have conflicting addresses.

As most people should know, the VIC

has 65535 addressable locations at which it would expect to find one device. Obviously, not all of these locations are external to the micro and the only locations that are of concern with this motherboard are RAM, ROM and I/O.

The connection of the motherboard should not affect the number of bytes free on the VIC and neither should it affect the consumers spending power too much. The cost of this useful item is just £24. For further information contact Stack on 051-933 5511.



# Mr Chip

## SOFTWARE

### COMMODORE 64 GAMES AND UTILITIES

#### JACKPOT 64:

At last its here, specially written for the 64, by the author of "JACKPOT" the ultimate Fruit Machine program for the VIC (available from 1st Nov) ..... £5.50

#### WESTMINSTER:

A game for up to four players, can you lead the party of your choice and win the general election, you tour the 60 constituencies (seats) buying votes, when you can, (just like the real thing!), this must be one of the first board type games specifically written for the computer, why play on your own, have fun with your family and friends playing WESTMINSTER ..... £5.50

#### RED ALERT:

A game for 1-4 players, with sound and graphics. Make money in casinos, commit robbery, hide from the police, hire secret agents, (some of whom can be treacherous), negotiate for weapons, find and attack the secret rocket base to launch the missile, and watch the havoc and destruction caused. There's no turning back from "RED ALERT" ..... £5.50 (available from 1st Nov)

#### WHEELER DEALER:

A game for two to twenty players, become a tycoon of the motor trade, you must obtain gearboxes, tyres and engines to produce cars for sale. Form syndicates, buy and exchange parts, buy dealerships, but be careful, you may become bankrupt and have to liquidate, find out what you're made of, have you got what it takes to become a WHEELER DEALER ..... £5.50

#### LUNAR RESCUE:

Our new version, avoid the asteroid belt, to rescue the stranded scientists, then fight your way back to the mother ship, fast reactions are required to safely land and dock your lunar module ..... £5.50

#### PONTOON - ROULETTE - ACE'S HIGH:

More powerful versions, that make three great games of chance for the 64 ..... £5.50

#### CHIPMON:

Contains a 1/ or 2/ Pass Assembler Disassembler and Monitor, a programming aid for the development of machine code programs and routines on the CBM 64

Tape Version ..... £12.50

Disk with extra features ..... £15.00

#### BANK MANAGER 64:

As our Super Bank Manager, but for the 64 ..... £7.50

Now available on disk with extra features ..... £10.00

#### PURCHASE LEDGER:

Easy to use, single entry, handles 400 invoices per month, Gross/Nett purchases, V.A.T. ..... £14.50  
Disk Version ..... £17.00  
(available from 1st Nov)

#### SALES LEDGER:

As above

### VIC 20 GAMES AND UTILITIES

#### JACKPOT:

This is it, the ultimate fruit machine for the VIC with nudge, hold and respin, 100% machine code. "Overall jackpot is a beautifully written simulation giving superb graphics, animation and use of colour. In fact, this programme makes Commodore's fruit machine cartridge look unbelievably cheap and nasty." Home Computing Weekly No. 20 19th July 1983 ..... £5.50

#### KWAZY KWAKS:

Accuracy and speed are required for this shooting gallery, superb use of colour and graphics in this new and challenging game from the author of "JACKPOT", 100% machine code program, to the same high standard, joystick or keyboard control. For the unexpanded VIC ..... £5.50

**PACMANIA:** Choose your own game from the following options – difficulty 1-3, speed 1-3, size of maze 1-3, visible or invisible maze, still or moving power pills, define your own key controls, any combination, if this is your type of game, then this is the one for you, for the 3K expanded VIC only ..... £5.50

**SNAKE BYTE:** Guide your ever hungry snake round the screen, eating the flies and wasps, to stay alive you must avoid the deadly mushrooms, quick reactions are required for this biting game, keyboard control, for the unexpanded VIC ..... £5.50

**BUGSY (Joystick Only)** This is a Minefield with a difference! As you step on the stones whilst collecting purple boxes which give you both time and points, they disappear from beneath your feet. DO NOT DESPAIR! "BUGSY" will randomly replace the stones but avoid bumping into him or its sudden death! An original, compulsive and challenging game ..... £5.50

**MINI-ROULETTE - PONTOON - HI-LOW** Three great games of chance for the VIC, try to beat the computer, hours of fun, full colour, sound effects and tunes ..... £5.50

**DATABASE** – create your own files and records on tape ..... £7.50

**SUPER BANK MANAGER** – A full feature version any memory size, but needs 3K expansion ..... £7.50

Full documentation with all utility programs.

Other software for the VIC and Commodore 64, send for free brochure, including **RABBIT SOFTWARE** at £5.00

Send Cheques/PO's to: **MR. CHIP SOFTWARE**  
**DEPT CC, 1 NEVILLE PLACE, LLANDUDNO,**  
**GWYNEDD LL30 3BL. TEL: 0492 49747**

All our programs are now available on disk. Please allow £2.50 extra.  
**DEALER ENQUIRIES WELCOME**

**WANTED** – High quality software of all types for export and UK distribution.

# Terminal enjoyment

Here we are again with another batch of recently released games for the VIC-20 and the CBM-64.

This month there's an even wider range than usual—from single games that don't challenge reflexes or intellect to those that challenge both reaction time and brain power.

## The Catch

To play The Catch from Bubble Bus, all you need is a cassette recorder, micro and monitor. A joystick is optional because you can control the game by using the keyboard. Z will move you to the right and C will move you to the left.

This game will only run on the VIC 20 without any memory expansion. The idea behind the game is to protect your city from the falling bombs which fall faster and faster as the game progresses. You guessed it! You have to protect your city by actually catching the bombs.

This is definitely a game for people who have fast reactions because the bombs are falling over the place at ever increasing speeds and frequencies. The colour of the background changes as the speed increases.

The player gets 10 points for each bomb he manages to catch in his movable shield and records of scores and high scores are kept at the top of the screen.

Quite a good game for a while although the speed of the action is not always appreciated by the eyes.

## Pinball Wizard

Terminal Software are back in the news again, this time with a game for the VIC 20 called Pinball Wizard, that makes excellent use of the machine's graphic capabilities, the graphics being absolutely superb, and the four function keys. It is written in 100% machine code for some great fast action. Unlike the previous two games described above, loading is straight-forward.

On the screen, what you are confronted with is basically a pinball machine. There are the usual pinball features and one or two player possibilities.

Four flippers are operated by the logo key and the shift key in the bottom left and right corners of the keyboard and the ball is launched by the 'plunger' which is controlled by F5 and F7. This game is so realistic that you can even alter the speed at which the ball is launched. Many products are accompanied by consumer-deceiving advertising blurb. Happily, this is not the case with this game. It is, as the manufacturers say, pure enjoyment with nudges, rollovers and jackpots and right from the moment you pull back the plunger you begin to realise what an amazing simulation game this is.

## Hungry Horace

Originally written for the Spectrum, Hungry Horace can now be played on the 64 and is a little bit like the now famous Pac-Man. Will Hungry Horace follow in Pac-Man's footsteps?

This is not as wild a question as it may first seem because Hungry Horace is

undoubtedly a good and occasionally funny game. It is published by Melbourne House who are perhaps better known for their books.

At the start of the cassette is a demonstration program which gives you an idea of the mazes you have to travel through (there are four in all). To actually start playing the game all you have to do is press the fire button or any other key except T and Control. These have a special significance described later.

Written in Machine Language, the aim of the game is for Horace to eat the flowers in the park and withstand the harassment from the keepers. To gain an extra pass for Horace, he must eat 10,000 points worth of flowers. That is a lot of flower eating but there are other ways to bump up the score. You could try eating the keepers lunch and if you steal an alarm bell then the keepers are in a real panic.

Sounds a little ordinary so far, but what about those keys mentioned earlier? The Control key allows you to create and save your own mazes! The user is then confronted with a menu with a list of several options which are selected by the cursor and F1. This puts you in the maze edit mode and from here on you can start to design your own maze. You can have tunnels, flowers, walls, bridges and exits literally wherever you choose to put them. Designs can be saved into memory overwriting any of your other designs for that area of the park.

The T key performs a process which Melbourne House call 'toggling'. Put in simple terms this means that the game will only use those mazes that are redefined, substituting the normal sections of the park otherwise.



# VIC 20

32K SWITCHABLE TO 3K, 16K, 24K, BLOCK 5.

**£49.95**

inc. VAT

16K SWITCHABLE TO 3K.

**£34.95**

inc. VAT

ALL UNITS GUARANTEED 2 YEARS. ADD £1 P&P.

OVERSEAS ORDERS ADD £3 P&P.

TELEPHONE YOUR ACCESS OR VISA CARD NUMBER  
FOR DESPATCH BY RETURN POST, OR SEND YOUR CHEQUE/P.O.'S TO:-

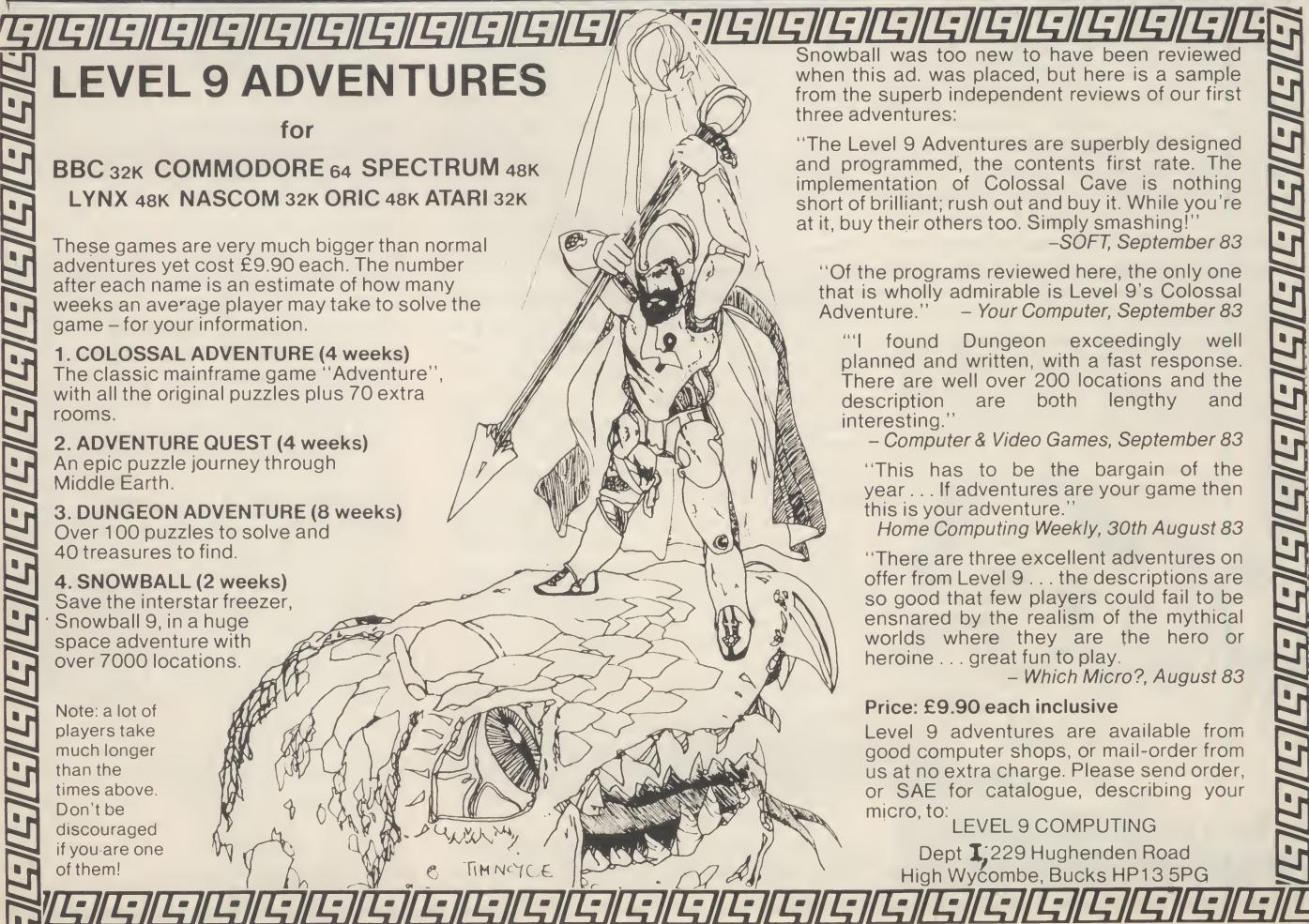
RAM PAK 32K 16K  
VICSPRINT. 64 CENTRONICS INTERFACE  
CARTRIDGE ADAPTOR £57.50 INC VAT.

**RAM ELECTRONICS (FLEET) LTD., (DEPT. CCI),**  
106, FLEET ROAD, FLEET, HANTS. GU13 8PA.  
TELEPHONE (02514) 5858.



SEE US AT  
**world of  
commodore**  
INTERNATIONAL CENTRE, TORONTO  
DEC. 8-11, 1983

**CALLERS WELCOME MONDAY TO SATURDAY. HALF DAY WED. TRADE ENQUIRIES WELCOME.**



## LEVEL 9 ADVENTURES

for

**BBC 32K COMMODORE 64 SPECTRUM 48K  
LYNX 48K NASCOM 32K ORIC 48K ATARI 32K**

These games are very much bigger than normal adventures yet cost £9.90 each. The number after each name is an estimate of how many weeks an average player may take to solve the game - for your information.

### 1. COLOSSAL ADVENTURE (4 weeks)

The classic mainframe game "Adventure", with all the original puzzles plus 70 extra rooms.

### 2. ADVENTURE QUEST (4 weeks)

An epic puzzle journey through Middle Earth.

### 3. DUNGEON ADVENTURE (8 weeks)

Over 100 puzzles to solve and 40 treasures to find.

### 4. SNOWBALL (2 weeks)

Save the interstar freezer, Snowball 9, in a huge space adventure with over 7000 locations.

Note: a lot of players take much longer than the times above. Don't be discouraged if you are one of them!

Snowball was too new to have been reviewed when this ad. was placed, but here is a sample from the superb independent reviews of our first three adventures:

"The Level 9 Adventures are superbly designed and programmed, the contents first rate. The implementation of Colossal Cave is nothing short of brilliant; rush out and buy it. While you're at it, buy their others too. Simply smashing!"

- *SOFM, September 83*

"Of the programs reviewed here, the only one that is wholly admirable is Level 9's Colossal Adventure." - *Your Computer, September 83*

"I found Dungeon exceedingly well planned and written, with a fast response. There are well over 200 locations and the descriptions are both lengthy and interesting."

- *Computer & Video Games, September 83*

"This has to be the bargain of the year... If adventures are your game then this is your adventure."

- *Home Computing Weekly, 30th August 83*

"There are three excellent adventures on offer from Level 9... the descriptions are so good that few players could fail to be ensnared by the realism of the mythical worlds where they are the hero or heroine... great fun to play."

- *Which Micro?, August 83*

**Price: £9.90 each inclusive**

Level 9 adventures are available from good computer shops, or mail-order from us at no extra charge. Please send order, or SAE for catalogue, describing your micro, to:

LEVEL 9 COMPUTING

Dept I, 229 Hughenden Road  
High Wycombe, Bucks HP13 5PG

# GAMES

## The Hobbit

The Hobbit is a new game from Melbourne House who have produced an adventure masterpiece with the help of the Tolkien Estate.

The screen is split up into two parts – the upper half is the adventure window and the lower half is the instruction window. All of the action takes place in the fantasy land of Tolkien's classic masterpiece (the special pack includes the book) and includes all the characters like Bilbo Baggins, Gandalf, Elrond and Thorin and many unfriendly beasts such as Goblins.

The mission is to seek out the evil Dragon and capture his hoard of treasure.

As soon as you enter any location, you will be given a full description of that place and exactly what is there. Communication with the computer is incredibly versatile because Melbourne House have built in a program called 'Inglish' which they claim to be the most 'sophisticated natural language recognition program yet developed on any microcomputer'.



This is not a wild claim, because almost any sentence relevant to the situation can

be typed in as long as it corresponds to the range of accepted commands. For example you could say 'drink beer', 'drink foaming beer', or even 'drink foaming delicious beer'.

There are several other ingenious commands available which would fill another magazine, but perhaps one of the more unusual commands is the print command which sends the contents of the adventure window to the printer as well as the screen.

Wonderful as this game may seem, it is so huge that if you get lost you could be taking a futile wander through a maze and the tedium of this may be very off-putting. Also, Melbourne House say that due to the immense size of the program they cannot guarantee that it is completely free of errors although a lot of time has been spent ensuring that the program behaves as well as it should.

However, we could not find any bugs and conclude that this is very much like Melbourne House's 'Hungry Horace' – an excellent product.



## Laser Strike

A marvellously exciting game in which the player controls the attacker fighter and must negotiate two defences – the asteroid field and the ice caves. Developed by Isis Hathor Digital Productions in America and marketed by Isis Hathor U.K. this enthralling game comes on disk and on cassette and requires a 1541 and a joystick.

The ship can be moved up, down and forward by moving the joystick up, down and left respectively and is very sensitive to the joysticks movements. Moving the stick to the right releases bombs and pressing the button fires a shot from the laser cannon. Once the game is loaded, the game can be started by pressing the F7 key and the fighter appears on the left of the screen. If the ship crashes before the

landscape starts, the program comes to an abrupt halt and has to be reloaded to start it again. Brown Asteroids and Asteroid cities pass across the screen and must be avoided.

Electrical fields cut across the screen and any contact with these, causes immediate electrocution. If a fighter is hit it slowly sinks to the floor and the crash causes a spectacular explosion. Points are gained by bombing the towers in the purple cities on the landscape and those on the Asteroids fetch 100 points.

The player gets two attackers in each game and at the top of the screen there is a display line which shows the score, the number of ships left in the game. The number of Sections left in the defence is represented by blue blocks. After the Asteroid field is the ice field and this involves getting through without crashing into the floor or the ceiling of the ice caves. Reactor stations lurk in the cave depressions and bombing them gains more points.

The graphics in this game really are very realistic and it isn't difficult to imagine that the landscape, asteroids and ice caves really are what they are meant to be and not just lumps of colour with names. The sound effects are very good and help the adrenalin keep going. Laser strike really is a most professional game, well thought out and compulsive playing.

Contact: Isis Hathor U.K. Address: Andrew Barrow, Royden, Perkstone, Prestwood, Gt Missenden, Bucks HP16 0JD. Telephone: 02406 3224. Cost: Cassette: £7.50. Disk: £19.95.

TERMINAL SOFTWARE

## WHAT DO THE REVIEWERS SAY?

### Commodore 64 SUPER SKRAMBLE!

Computer & Video Games (Sept '83) said "an excellent game." Personal Computer News (15-21 Sept '83) rated it 19 out of 20!

### Commodore 64 SUPER DOGFIGHT

Personal Computer Games (Dec '83) said "I would recommend it as a very compulsive and rare two-player game."

### Commodore 64 SUPER GRIDDER

Personal Computer News (22-28 Sept '83) said "a compelling piece of frivolity that could give hours of fun."

### VIC 20 PINBALL WIZARD

Personal Computer Games (Dec '83) said "this is as good as you will get."

### VIC 20 SKRAMBLE!

Computer & Video Games (March '83) said "a miracle of memory conservation...a thrilling and addictive game."

ASK ABOUT OUR TEN OTHER TITLES  
FOR THE VIC 20

## NEW TITLES FOR THE Commodore 64

An addictive arcade-style game of skill and anticipation

### STELLAR DODGER ★ HUNTER

A fast-action tactical game your reflexes to really stretch



#### PRINCIPLE WHOLESALE DISTRIBUTORS

UK: PCS, Blackburn, Centresoft, W. Midlands, Softshop, London, Crestsoft, London. Europe: Tial Trading, Nr. Malmö, Aashima Trading, Rotterdam, Wico-soft, Dusseldorf. New Zealand: Alpine Computing, Auckland. Australia: Ozisoft, Sydney. USA: Microdigital, Webster N.Y.

#### SELECTED TITLES NOW AVAILABLE IN

Dixons Software Express

Greenchip  
at Debenhams

LASKYS

TERMINAL SOFTWARE  
28 CHURCH LANE, PRESTWICH, MANCHESTER M25 5AJ  
TEL: 061-773 9313



### EXTERMINATOR



Definitely one of the best arcade action games around for the 64. Shoot the worm and everything else in the garden whilst avoiding the deadly spider and swooping eagle. Machine code using high resolution and Sprite graphics with excellent sound. Beware, it's very addictive.

OTHER CBM 64 TITLES:  
QUIZZER  
LABEL PRINTER  
POSTER PRINTER  
ADVERTISER

### HUSTLER

Written in machine code and using Sprite graphics HUSTLER takes the 64 to its limits. There are six 'pool' type games for one or two players, high scores kept and super music. Machine code. See the great press reviews.



VIC 20 TITLES:  
EXTERMINATOR  
ANTIMATTER SPLATTER  
THE CATCH  
QUIZ MASTER  
POST  
LABEL  
FLOWCHARTER

### KICK-OFF

A unique game based on the famous Table Football game with the moving rods through the players. Amazing graphics and music. For one or two players. Two players use two joysticks simultaneously. Machine code.



### WIDOWS REVENGE



Similar to our 'Best Seller' Exterminator, but this game fires back! Obliterate all of the Widows Warriors but watch out for Photon Webbs and devious Egg Layers. Machine code.



bubble bus products are available from:

LIGHTNING DEALERS - SPECTRUM SHOPS - GREENS - SELECTED H.M.V. SHOPS - GAMES WORKSHOPS - CENTRESOFT STOCKISTS - PCS STOCKISTS.

If you have any trouble buying our products, you may buy direct.

**bubble bus software, 87 High Street, Tonbridge, Kent TN9 1RX**

Please send me \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

I enclose my cheque/Postal Order for £ \_\_\_\_\_ please add 50p for post and packing

# GAMES



## Bewitched

We kick off with several games for the VIC, the first one from Imagine.

Their game is called Bewitched and it certainly is that. It is also frustrating and very good - a fine example of a game written by an amateur programmer and snapped up by a software house who clearly recognise good quality game material.



## Kwazy Kwaks

Kwazy Kwaks is the next game for evaluation from Mr Chip Software and the idea here is quite simple. It is a shoot-them-while-you-can game and is a

Besides the micro, you also need a cassette recorder and a monitor. It does not matter whether the monitor is colour or black and white although for purposes of clarity the colour is best because the object of the game is to navigate your way through a maze by opening coloured doors with the correctly coloured key.

On loading the game, you may think you have stumbled across some ancient Egyptian documents because of the strange characters that first appear. You will be glad to know that you haven't because the author says this is a normal part of the loading process.

The first screen is a maze that is split into three levels by doors and walls and your task is to pass through one of the different colour keys and move down to the corresponding keyhole and open it. Having done this, you will be faced with a blank space or a wall. If you get the latter that means you have to start all over again.

Once you get to the bottom of the screen the whole thing scrolls and the next section is revealed. This game is not as easy as it sounds because there are several horrible little ghosts floating around that like to devour you (although if you are lucky there are occasions when you can walk right through them).

The control is either by keyboard or joystick. If you choose the keyboard do not be fooled by the instruction which says to go up press P. The necessary key is in fact Q. Do not let that restrain you from buying what is otherwise a worthy game.

variation of the shooting alley often found at fair grounds.

The object of the game is to shoot down all the objects in the shooting gallery, and these objects move across the screen at up to eight different speeds. There are three rows of targets like ducks, owls etc. all of which have different points according to which level they are on. The top row is six points, the second is four points and the final row is worth two points.

There are two main constraints to how many points you can score. The first is time and the second is the number of bullets left. There are several levels to this game and at the end of each screen you will be given up to eight points for each bullet you have left plus the value of the timer.

Control is either through the keyboard or by a joystick and, like Bewitched, the loading procedure is out of the ordinary. You have to wait for the picture to come into focus.

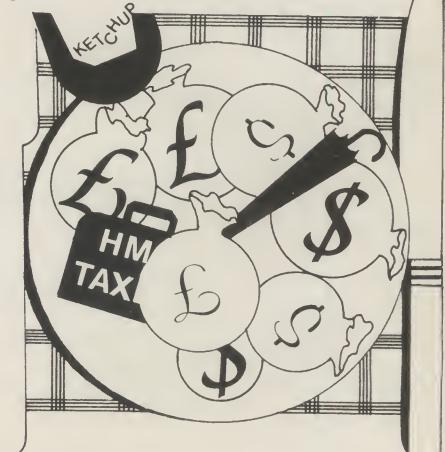
Super Copter is a flight simulation game controlled by the use of the keyboard. The mission is to fly to an enemy island and defuse a nuclear warhead.

There are several screens which can be viewed at the touch of a button.

There is a view of the cockpit which enables the player to see all the necessary equipment and information relating to the aircraft like revs per minute, altitude and rockets available.

The second screen is a radar map of the flight path which includes detailed geography of the island. The disadvantage in using this screen is that the player cannot control the supercopter and quick reflexes may be needed to avoid mountains and enemy missiles. The final screen is an actual view of the enemy island and the pilot has to land the helicopter on the pad to successfully complete the mission.

There are nine levels of play to this game.



Tax Man is similar in concept and design to Pac Man. The player has to eat up as much money as possible and avoid the tax men who are trying to make you bankrupt. There are six levels of play to this game as well as the possibility of eating the tax men and thus gaining more money. The game can be controlled by the keyboard or by using a joystick in port one. Both of these games cost £5.95.

Mandatta are a new company and they are accompanying their games with a free entry to a prize draw, the winner of which will receive a disk drive and printer. Mandatta's intentions are to produce software solely for the 64 and, although they are still looking for games programmers, they are hoping that their products will be distributed on a world wide scale in 1984. Distribution is currently performed by themselves on a mail order basis. Their address in the UK is 38 Cuddington Avenue, Worcester Park, Surrey KT4 7DB. Telephone: 01-337 0806.

**Arcade software for COMMODORE 64**  
Action-packed 100% Machine Code



£6.95

"There in the sky I saw the screaming alien birds. They had come to invade our planet. People ran in wild panic and desperation in some vain hope of escape. But there was no escape. The aliens swooped out of the sky killing anyone in their path. I alone decided to stay and fight, but then the eggs hatched and the true horror began..." A fast-moving Galaxian type arcade game with Hall of Fame and bonus lives. Uses one joystick.



£6.95

Scale the ladders to get your Space Hammer but watch out for the homicidal Meanies", the slightest touch and you'll be electrocuted. Once the Hammer is in your hands you can start to rid the world of the meanies: chase them up and down the ladders, through the escape door, lure them into holes dug with your space hammer. When you trap one, rush over and BONK him on the head. But Hurry! If you loiter he will climb out, fill in the hole, and then home in on you, flashing in anger! To add to your problems your oxygen is running out and the meanies move fast the more you kill. A superb arcade-style game with Hall of Fame. Uses one joystick.

**LATEST RELEASE – AVAILABLE NOW!**  
**CYBERMEN**

You, our hero, attempt to remove the platinum from the Cosmic space station inhabited by the Cybermen. Programmed to destroy all intruders, their duty is to protect the precious metal. For safe keeping this has been distributed throughout the random maze of corridors of which the space station consists. Not only do the Cybermen home in on you but you will be electrocuted if you touch the maze walls. Your phaser will kill the Cybermen but the corridors are also patrolled by the indestructible overseer who possesses the unearthly power of moving through walls.

All orders despatched by return first class post.  
Callers and Trade enquiries welcome.

Dept CC 12 2 Glensdale Street, Leeds, LS9 9JJ.  
Telephone (0532) 480987

**J. MORRISON (MICROS) Ltd.**  
Suppliers of quality machine code software since 1978



**COMMODORE 64**  
**SOFTWARE**

**Flight Simulator**

Pilot your own aircraft to a wide choice of airports in U.K. Magnificent graphics.  
Requires joystick.

Cassette game £9.95p.

**CBM 64 Assembler**

Write, read and copy your own machine code programs.

Cassette £6.95p.

**Just released-GOLF**

Play golf on this 18 hole par 72 course.  
Challenging game for all levels.  
Improve your handicap at home:

Cassette game £7.50p.

**Lifetime replacement guarantee**

Mail order only to:

**Anger Productions 14 The Oval, Broxbourne, EN10 6DQ.**

Flight  £9.95   Assembler  £6.95   Golf  £7.50

NAME .....

ADDRESS .....

Cut out coupon, tick which program(s) required  
and send to us with remittance



51 Meadowcroft, Radcliffe,  
Manchester M26 0JP  
Tel: 061 724 8622

**Quality arcade action games for the**  
**COMMODORE 64**

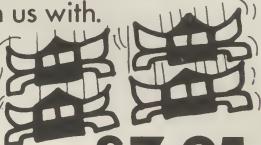
**GALAXIONS** The earth is being invaded by an alien force, the GALAXIONS have arrived from a dying planet, determined to destroy civilization as we know it. They came in formation, swooping and diving towards the planet earth. You and you alone can save mankind from the terrifying destruction the aliens threaten us with.

100% Machine Code

3 Lives

Bonus ship at 10000

Progressive levels of play



**£7.95**

**munch man 64**

A fantastic version of this popular arcade game.

100% Machine Code

3 Lives, Bonus fruit

Power pills

4 Very intelligent ghosts



**£7.95**

**Robin to the Rescue**

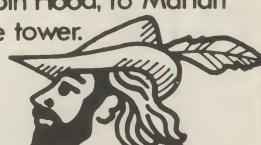
In days of old when knights were bold and the sheriff was in power, to play this game guide Robin Hood, to Marian locked up in the tower.

100% Machine Code

Sprite Graphics

3 Lives

12 Screens of arcade action



**£7.95**

All our games are available mail order P&P included from the above address. Orders sent by return post.

Also available from all good computer shops.

Distribution, PROGRESSIVE London,  
P.C.S. Darwen, CENTRE SOFT West Midlands  
ALPHA TAPES, Merseyside, TIGER, Cheshire,  
CALISTO, Birmingham, LIGHTNING, London,  
LEISURESOFT, Northampton.

# Computer shop

# Commodore 64



# COMMODORE 64 COMPUTER

- \* Excellent Keyboard
- \* High Resolution Graphics
- \* Suitable for Home or Business Use

Also available  
\* Sound Synthesiser  
\* Printer \* Disk Drive  
\* High Quality Software

**BIG  
PRICE**

Previous W.H.Smith Price

Now Only

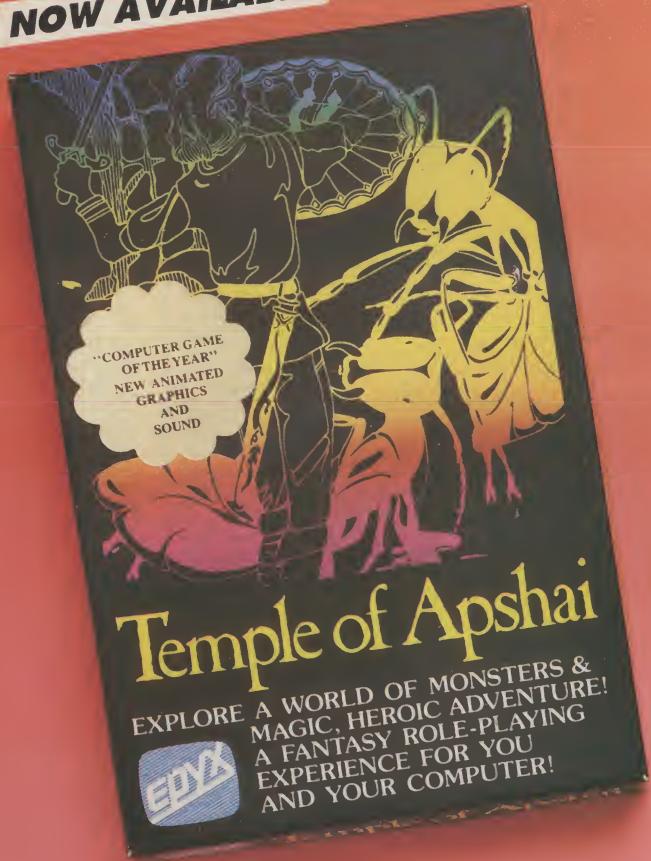
## SAVE

16K £6

- \* The most popular computer.
- \* Wide range of uses for entertainment and business.



**NOW AVAILABLE**



# **TOP SELLING GAMES FOR COMMODORE PERSONAL COMPUTERS.**

**FROM Epyx/AUTOMATED SIMULATIONS**

From Epyx/Automated Simulations (USA), a role playing game of fantasy and adventure where you enter the mighty Temple of Apshai and fight with giant antmen, carrion beasts, centipedes and other monsters within the dungeons and chambers of the buried temple to reach the treasures of gold, diamonds and emeralds.

Epyx games require intelligence, imagination, intuition and skill.

Price

**£29.95**

**Sword of Fargoal** £22.50

**\* Jumpman** £29.95

**Fire One** £26.50

**Starfire** £26.50

**\* Dragon Riders of Pern** £29.95

**Crush, Crumble, Cromp** £22.50

\* Available for CBM 64 only.  
(Prices include V.A.T. and postage).

#### **TO ORDER:**

Tell us your microcomputer model and the game format (e.g. disk or cassette). List games required and send cheque or money order to:-

**SOFTALK**  
16-18 Princess Victoria Street,  
Clifton, Bristol BS8 4BP, Avon.



# A micro for Christmas

Whether you are looking for a computer as a gift or have decided that you deserve to treat yourself to one you'll find yourself spoilt for choice. What should you look for in a home computer? And what have Commodore's two popular machines – the VIC-20 and CBM-64 – got to offer?

Today the shops are full of home computers all with new names and attractive features. All are heavily promoted giving the distinct impression that they are the only choice. But this large number of home computers really doesn't help the first time buyer. Instead it creates confusion, so that the final choice is made even more difficult. Let's take a close look at the reasons why people buy a home computer and the ways they can help you and your family.

Computers can help a family, in recreation from the wide range of games on the market to knowledge contests like Mastermind. As computers are used extensively in schools, having one in the home complements the knowledge that your children have learnt at school. On a more serious note this same home computer can help learn a foreign language, to organise information – from recipes to video cassette collections, and even lend a hand in business.

So the actual use of the home computer is up to the buyer and the most important feature isn't in the specification at all. It lies with the choice of programs and without a large choice, a highly promoted brand won't really help you.

Out of the large number of home computers on the market how do you select the best one in the price range from around £100 to £200 plus?

#### The programs

Most home computers use cassettes for their programs. They take quite a long time to load into the computer, but have the distinct advantage of being low in price. To increase the speed of loading a program some home computers use a plug-in cartridge. They are more expensive than cassettes, but have the advantage of almost instant loading and the facility of being available with more sophisticated programs. The most versatile way of storing programs is by using a floppy disk, which looks just like a 45 r.p.m. record. However, disk drives are more expensive but well worth it, if you need to store lots of information and find it fast.



#### The keyboard

Most low priced computers have one main fault which is accepted by the user because of the amount they have spent. Its the price of paying £100 – £150 for a home computer. These machines which have a keyboard that may have the same layout as a typewriter but certainly don't feel like one. In fact if you want to use the keyboard like a conventional typewriter for word-processing, its difficult, to put it mildly. Any keyboard should look and feel just like a typewriter and also have special function keys which are needed with the more sophisticated programs.

#### Your television set

Any worthwhile home computer should be usable with any average domestic colour television. There shouldn't be a significant difference in the colour quality between different brands of TV. Using the computer should be as simple as unplugging the aerial and just replacing it with the lead from your home computer.

Many people are put off buying a home computer, because they think that you must learn a new foreign language called BASIC. While you can learn a language if you like, there are other alternatives.

Buy your programs off the shelf, there should be a wide range for your chosen micro, or write them yourself. Yes, there is even a program which can write a computer program for you without learning a foreign language. Its called a program generator.

#### Which brand?

Out of all the brands on the market, why choose Commodore? Because only Commodore can answer all the points we have made in this introduction with a positive YES. Not soon, in the near future, or will be, but NOW. And with news of some micro manufacturers just shutting up shop, then you need to be sure of the future for your chosen home computer.

Commodore have two models in the £100 to over £200 price range. The Vic=20, lowest priced model of the range has sold

# Superbase 64

TRANSFORMS THE COMMODORE 64 INTO A FULL-FEATURED AND PROFESSIONAL DATABASE SYSTEM! WITH UP TO 1000 CHARACTERS PER RECORD ON UP TO 4 SCREENS... AND UP TO 128 ITEMS PER RECORD, DEFINABLE AS KEY, TEXT, NUMERIC, CONSTANT, RESULT OR DATE... IN FILES OF UP TO 16K CHARACTERS! SUPERBASE EVEN HAS SPREADSHEET AND CALCULATOR CAPABILITY, CALENDAR FUNCTIONS, EASY INPUT FROM WORDPROCESSOR/DATA FILES, BOTH MENU-DRIVEN AND PROGRAM OPTIONS, SORTING/SEARCHING, FULLY DEFINABLE OUTPUTS... SUPERBASE 64 IS ESSENTIAL IF YOU WANT THE MOST FROM YOUR 64! SUPPLIED ON CBM 1541 DISK WITH EXCELLENT TUTORIAL/REFERENCE MANUAL. EX-STOCK NOW!

● OUR PRICE ONLY £99.95 £88!

## VIZAWRITE 64

FORMATTING, THAT TAKES FULL ADVANTAGE OF THE 64'S COLOUR, GRAPHICS AND MEMORY FEATURES... AND SUPPORTS VIRTUALLY ANY PRINTER! WITH A COMPREHENSIVE AND EASY-TO-FOLLOW USER MANUAL, VIZAWRITE OFFERS THE ULTIMATE IN PERSONAL COMPUTER WORD PROCESSING! ALSO AVAILABLE ON DISK (OUR PRICE £99.95 £85!), OR COMBINED WITH VIZASPELL (OUR PRICE £99.95 £85!).

● OUR PRICE ONLY £99.95 £68!

## Master 64

MASTER HAS 85 NEW COMMANDS... AND BASIC IT TOO! PLUS PROGRAMMER'S TOOLKIT, MACHINE CODE MONITOR, BUSINESS BASIC, KEYED DISK ACCESS, SCREEN MANAGEMENT, USER-DEFINABLE INPUT ZONES, REPORT GENERATOR, 22-PLANE ARITHMETIC, DATE CONTROL, STRING FUNCTIONS, DISK DATA COMPRESSION, SCREEN PLOTTING, SCREEN DUMP, OPTIONAL SOFTWARE PROTECTION KEY, AND MORE... IN FACT EVERYTHING YOU NEED TO PROGRAM YOUR 64 TO TOP PROFESSIONAL STANDARDS! MASTER 64 COMES WITH A FULL USER REFERENCE MANUAL, QUICK REFERENCE GUIDE AND DEMO PROGRAMS. ALSO AVAILABLE FOR CBM 700 (£39.25) AND CBM 4032/8032/8096 (£39.25 £225!).

● SPECIAL OFFER PRICE £115!

THESE ARE JUST SOME OF OUR FINE SOFTWARE PRODUCTS FOR COMMODORE COMPUTERS... PLEASE TELEPHONE OR WRITE FOR FREE DATA SHEETS! PRICES SHOWN INCLUDE 15% VAT AND ARE CORRECT AT TIME OF GOING TO PRESS. ORDER BY POST/TELEPHONE/PRESTEL, USING CHEQUE, ACCESS, BARCLAY CARD OR OFFICIAL ORDER. TELEPHONE 01-546-7256 FOR SAME-DAY DESPATCH! POST FREE EXCEPT ON CREDIT/OVERSEAS ORDERS. (REF A23)

## Calco Software

LAKESIDE HOUSE, KINGSTON HILL, SURREY KT2 7QT TEL 01-546-7256

# OFFICE 90's SYSTEM

Software for the Commodore 64K computer



Sales/Purchase Suite	Day Cashbook/ledgers	£149.00
Petrol Station Accounts	Daybook/Petrol Stock	£99.00
Daily Cashbook		£49.00
Address/Mailing list		£35.00

AVAILABLE FROM MICRO ASSOCIATES

471 Lichfield Road

Aston

Birmingham B6 7SP

Tel. 021 328 4574 and  
Walsall 649695

Multiple purchase DISCOUNTS to Dealers  
information on request.

## PETX2

doubles the speed  
trebles the memory

... of your PET computer!

For users of the CBM PET 2000, 4000 or 8000 series of computers who want to upgrade to new generation standards, computer specialists J.R. & S. Purdue have developed the PETX2 add-in board. Manufactured to the most exacting standards, PETX2 uses the latest microprocessor technology to double the processing speed of your CBM system, whether running BASIC, Silicon Office, Visicals, or any other application. The system comprises one board positioned inside the computer which can be fitted in 10 minutes using only a screwdriver. The board provides 80K of memory, thus upgrading 32K systems to 96K and replacing current 96K versions. This development means that your investment in software and data is protected; by enhancing your machine speed, it comes into line with the Sirius, Osborne and even some 16-bit machines, as can be seen from the table of Personal Computer World Benchmarks.

Machine	BM1	BM2	BM3	BM4	BM5	BM6	BM7	BM8	Average
CBM with PETX2	0.87	5.1	9.0	10.3	11.2	16.5	28.0	6.0	17.5
IB-1700	1.5	8.2	12.1	12.6	13.6	23.6	37.4	3.5	17.6
Osborne 101	1.4	4.4	11.2	11.6	12.4	21.9	34.9	6.1	15.9
Apple 11	1.7	2.2	13.6	14.5	16.0	27.0	42.3	7.5	20.7
ACI Sirius 1	2.0	2.4	12.0	12.6	19.8	35.4	55.9	4.3	20.4
Apple 2	1.3	8.5	16.0	17.8	19.1	28.6	44.8	10.7	30.4
Commodore ComMod 32	1.7	10.0	18.4	20.3	21.9	32.4	51.0	11.9	34.2

### TECHNICAL DATA

6502 processor running at 2mhz  
128K of 4164 dynamic memory  
Bank switching - VDU Peek Thru  
I/O Peek Thru

J.R. &  
S. Purdue

1 Port Hill, Hertford, Hertfordshire SG14 1PJ.  
Telephone Hertford (0992) 57392

## Low price high quality software for Commodore 32K Pet & 64

Integrated accounting systems, Purchase ledger, Sales ledger, Invoice printing, Statements, Trade and early settlement discounts, Payroll with SSP and seven overtime/piece work rates, Stock control, Cash Book, Nominal ledger, will complete audit trail etc etc.

### Purchase & Sales Control £80.00 + VAT

Runs both purchase and sales ledgers with optional circulation of VAT from the gross or nett amount, analysis by accounting period, "Due for payment report," totals for NETT VAT and gross. Print invoices on your own stationery laid out according to your own instructions. Suitable for small businesses only. Any 32K Pet or 64.

### Stock Control £60.00 + VAT Nominal Ledger £60.00 + VAT

Produces trial balance and up to twenty reports in addition to Profit and Loss and Balance sheet. This programme can be used on its own and it can read files set up by our Purchase and Sales control.

Write or phone for further details

## ELECTRONIC AIDS (TEWKESBURY) LTD

Mythe Crest, The Mythe, Tewkesbury  
Gloucestershire GL20 6EB  
Tel: 0386 831020/0684 294003

# CHRISTMAS GIFTS

over 2 million worldwide and over 170,000 here in the UK. At the top end of this market their Commodore 64 has sold over 90,000 in just six months, so by Christmas this year will be in six figures too. In fact current figures give Commodore 35-40% of the UK home computer market.

Being brand leader on its own isn't enough, but Commodore can answer the important question of choice of programs with YES. No extra adaptors are needed to use cartridges. Their disk drive actually exists. The choice of programs is constantly increasing and ranges from the simplest game to the most sophisticated business package.

the Model 1526, another dot matrix unit, works twice as fast, 60 characters per second and costs £345. The plotter available for both machines costs just £169.99 and is quite remarkable value. It prints graphs and histograms in four colours, plus characters and numbers at 14 characters per second.

## Programming

Commodore produce a range of programs to ease you into writing your own programs, so it can be easier than you thought.

If you don't want to learn, buy programs for a specific interest, be it word-



## Printers and plotters

There's no substitute for seeing the information you have stored on disk or tape printed out. Equally that program just created can be easily debugged once a print-out is made. So to complement your Vic=20 or Commodore 64 you need a printer.

Preferably one produced by the computer manufacturer, so that it can work without any problems and match the needs of your home computer. If you want to print out shapes and drawings produced by a graphics package, then a plotter can be very useful.

Commodore produce two printers for use with the Vic=20 and C64. Their dot matrix printer 1525 works at 30 characters per second and costs around £230. While

processing, education, pure home use, games, thinking games or business use. And if writing your own programs appeals, but not learning a language like Basic, try Codewriter for the Commodore 64. It will generate a program for you in English.

## Conclusion

Even though there have been lots of new strange names appearing on the home computer scene in the last twelve months, you'll have a difficult job finding better value than the Vic=20 and Commodore 64. Unlike their competition they are available now, plus their wide range of peripherals and accessories, so a complete system can be bought for Christmas.

## Commodore 64

Looking remarkably like the Vic=20, the Commodore 64 can be considered to be its big brother. The main and most significant difference lies in the amount of RAM - Random Access Memory.

With the Commodore 64, this is 64K, the same amount fitted to far more expensive computers costing three and four times as much. As a result the Commodore 64 can be used with far more sophisticated programs than the Vic=20.

This makes it more suitable for use with a small business, as the programs and datafiles need more space. In fact there is also a program available for the Commodore 64, which lets you write a program without bothering to learn Basic. With a list price of around £230, the Commodore 64 offers a combination of the highest amount of RAM plus by far the best keyboard in its class. Like the Vic=20 accepts programs on cassettes, in cartridge form or using the optional floppy disk drive.

## Vic=20

The Vic=20 is the lowest priced of the Commodore home computer range and is being currently sold as a starter kit around £150. Shopping around will bring this price down to around £135. The computer can also be bought on its own for around £100.

The Vic=20 has 5K of memory as standard, however this can be easily extended up to 19.5K with one of a range of memory expansion units. The screen of your television will display a 32 character display and the keyboard is just like a conventional typewriter, plus a set of special function keys. Excellent sound and sound facilities complete the specification.

Users of the Vic=20 have a choice of cassette or cartridge loading programs. There is a disk drive unit available for use with more serious and sophisticated programs.

The Vic starter kit comprises the computer, special cassette unit, introduction to Basic and four programs. So it's ready to use as soon as the lead is plugged into your domestic TV set.

# Joysticks

## J7

The J7 joystick from Flight Link Control is compatible with the VIC 20. Coming in a compact case, the joystick uses four microswitches to give exact and rapid control of those fast moving games. Available from local dealers or Flight Link Control Limited, Unit 12, The Maltings, Turk Street, Alton, Hants. 0420 87241.

## Joystick

This joystick from Commodore can be used to play the arcade-type games for the CBM 64 and when used with high resolution graphics can draw pictures and help with graphic plotting. £7.50. Available from Vicsoft. Telephone: 0753 73638.



## Redball Joystick

An arcade type joystick with a red ball handle that can move into 8 standard positions. It has two fire buttons on the base and one on the top of the handle. A slide button enables the user to select a fire button. Comes with a 5 foot long cord. £27.95. From Silica Shop Ltd, Dept. ZPCW 0883, 1-4 The Mews, Hatherley Road, Sidcup, Kent. Telephone: 01-309 1111.

## PRO-ACE

The Pro-Ace joystick is compatible with the VIC 20 and the 64. It costs £12.95 and has two fire buttons. Available from Sumlock Microwave, 198 Deansgate, Manchester. Telephone: 061-834 4233.

## TAC

The Suncom Totally Accurate Controller (TAC 2) joystick has an arcade style ball stick handle and two responsive fire buttons. The suggested retail price for this Commodore 64 and VIC 20 compatible joystick is £18.95. The Slik Stik joystick has one fire button and an extra long lead. The suggested retail price for this square based unit which will work with the 64 and the VIC is £9.95. Both of these joysticks are from Consumer Electronics Limited, Failsworth, Manchester M35 0HS. Telephone: 061-682 2339.

## Starfighter Joystick

A sturdy joystick 3½ inches tall with a small stick. It has smooth rounded corners and a red firing button on the base. Comes with a two year guaranteed. £13.50. From Silica Shop Ltd, Dept. ZPCW 0883, 1-4 The Mews, Hatherley Road, Sidcup, Kent. Telephone: 01-309 1111.

## Joy-Sensor

An electronic joystick simulator by Suncom. It is designed to replace the more conventional joystick and provides a combination between control and responsiveness. With a rapid or single fire feature and a four or eight way control to cope with action or maze games. £29.95. Details from Consumer Electronics Ltd, Failsworth, Manchester M35 0HS. Telephone: 061-682 2339.

## Quickshot

A joystick with a continued grip and a positive response fire button as well as a more conventional firing button. A rubber suction cup footing is provided to help stabilise a one hand operation and it has a four foot cord. £11.95. From Vulcan Electronics Ltd. Telephone: 01-203 63667.

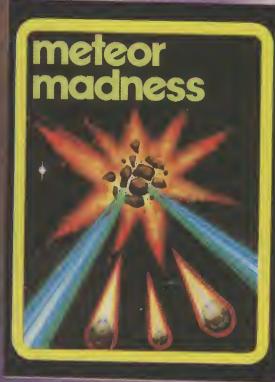
## The Analogue Joystick

It is possible to write programs using this analogue joystick. It adds another dimension to the games written and it gives full joystick control in any direction even in a figure eight or in loops. £14.95. From Stack Computer Services Ltd, 290-298 Derby Road, Bootle, Liverpool.

## Paddle Controllers

Two paddles moulded in black with red firing buttons at the side. £13.95. From Silica Shop Ltd, Dept. ZPCW 0883, 1-4 The Mews, Hatherley Road, Sidcup, Kent. Telephone: 01-309 1111.

**spectresoft**



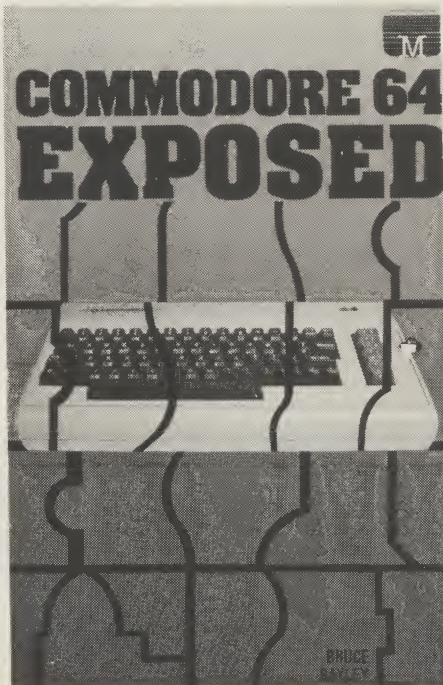
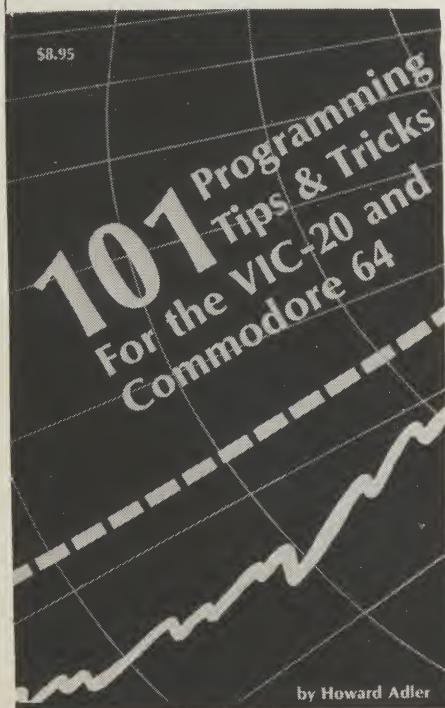
See them at your local Dealer  
**spectresoft Ltd.,**  
**19 The Broadway, Southgate, Middlesex**  
01-882 6504

# Review

'Volcanic Games for your VIC 20' costs £3.95 contains 30 games, some of which require 16K expansion. Content consist of explanations, program listings and drawings. The publishers are Addison-Wesley Publishers, 53 Bedford Square, London WC1B 3DZ telephone 01-631 1636.

'VIC 20 User Guide' attempts to explain what the user can do with the VIC 20 beginning with BASIC programming and progressing to graphics and sound. The cost is £10.95. 'Armchair BASIC' explains the difference between hardware and software, guides the reader through the fundamentals of BASIC programming and shows how a computer uses input to produce results. The cost is £9.95. The publishers of both books are Osborne-McGraw-Hill and the books are available from the Computer Bookshop, 30 Lincoln Road, Olton, Birmingham telephone 021 707 7544.

Three books and tapes for the beginner 6502/6510 assembly language programmer. There is 'Beginners Assembly Language for the PET 2, 3, 4 and 8000 as well as the VIC 20 and 64. The cost of each is £14.95 from Honeyfold Software Limited, Standfast House, Bath Place, High Street, Barnet, London telephone 01-441 4130.



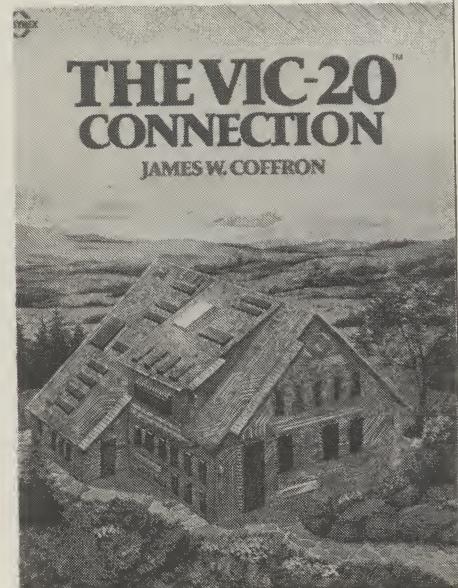
'VIC 20 Exposed' costs £6.95. Explains functions and programming variables and teaches the user how to take full advantage of the VIC 20's capabilities. 'Commodore 64 Exposed' also costs £6.95 and is an encyclopaedia of solutions from BASIC programming through to machine language. Both books are available from Melbourne House Publishers Limited, Melbourne House, Church Yard, Tring, Hertfordshire HP23 5LU. 'The VIC 20 Connection' shows the user how easy it is to use the micro in conjunction with household devices. This book is published by Sybex and is available from The Computer Bookshop, 30 Lincoln Road, Olton, Birmingham telephone 021 707 7544.

'VIC 20 Computer Program Writing Workbook' cost £4.25. A reference guide to BASIC and graphics, the book also contains 80 forms to make software writing easy. From Columbus Books, Devonshire House, 29 Elmfield Road, Bromley, Kent BR1 1LT telephone 01-290 6611.

'VIC Graphics' provides the reader with an introduction to programming techniques used to generate graphic displays. Topics include colour, plotting, rotation and movement. The price is £6.95 from

Ducksworth, The Old Piano Factory, 43 Gloucester Crescent, London NW1

'Write Your Own Adventure Programs' includes program listing for the VIC and PET. Step-by-step guide to writing adventure games programs with expert tips. 'Practical Things to do with a Micro-computer' is aimed at the micro beginner. Programs include building a robot. 'Guide to Better BASIC' is a beginner's guide to writing programs in BASIC. All books are priced £1.99 and are published by Usborne Publishing Limited, 20 Garrick Street, London WC2E 9BJ.



Duckworths have launched a number of books about the VIC and 64 to complement *The Commodore 64 Revealed*, *VIC Graphics*, *VIC Programmes 1* and *VIC Revealed*, the prices of which start at £6.95.

*Using The Commodore 64* is a complete look at the latest home computer from Commodore. This book starts with a BASIC refresher course and moves on to look at things like peripherals, chips, BASIC and M/C instruction sets and an M/C assembler/disassembler listing. Illustrated with example listings, the book costs £9.95.

*Exploring Adventure Games on the 64* is designed to get the 64 user to write down their own games. Inputting information, mapping, movement, vocabulary and everything else required to write



an adventurous game are explored. The games listed in this book (which costs £6.95) are also available on cassette for £7.95.

Adventure games are also catered for in a book called *Exploring Adventure Games on the VIC* which is very similar in content to the previous book. The price is £6.95.

*Commodore 64 Games* contains 15 new games written specially for the machine and again the price is £6.95. *The Beginner's Guide to Computers and Computing* is written for those people who know nothing about computers. It contains a history of computing and a glossary of computing terms.

*Sprites and Sound on the Commodore 64* is a guide to the 64 with working explanations of the 6581 SID chip, the 6566 Video Interface Chip and the 6510. There are sections on programming your own musical instruments and producing sprite and programmable character animation.

Next on Duckworth's list come two handbooks, one for the VIC the other for the 64 which purport to tell you all the vital information you need when using either machine.

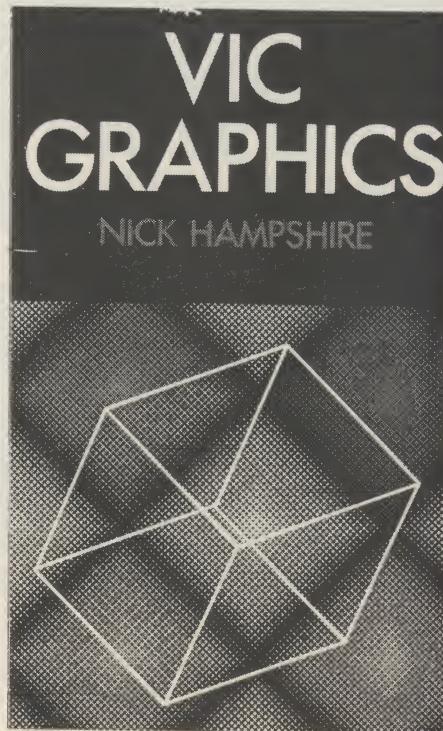
Other books from Duckworth's include *Advanced BASIC & Machine Code for the 64*, *Commodore 64 Graphics*, *Advanced BASIC & Machine Code for the VIC*, *Twelve Simple Electronic Projects for the VIC*, *VIC Games* and *Will You Still Love Me When I'm 64?*. All of these books start at £6.95.

Contact: Duckworths, The Old Piano Factory, 43 Gloucester Crescent, London NW1 7DY.

'34 VIC Computer Programs for Home, School and Office' cost £7.75. All of these programs have been designed for easy and quick typing into the micro and are aimed at the beginner. '101 Programming Tips and Tricks for the VIC 20 and Commodore 64' costs £7.95. Both books are available from Elkan Electronics, 11 Bury New Road, Prestwich, Manchester M25 8JZ telephone 061 798 7613.

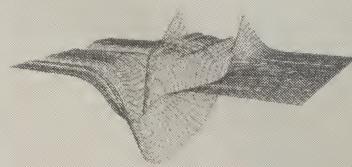
'Mastering the VIC 20' studies BASIC and VIC 20 structure and offers many programs which can be supplied separately on tape or disk. Contents also include peripherals and hi-res graphics in BASIC and Machine Code. Publishers are Ellis Horwood Limited, Market Cross House, Cooper Street, Chichester, West Sussex PO10 1EB.

'The Easy Guide to Your Commodore 64' explains how to use software and teaches the basics in programming. Practical operations include word processing, budgeting, filing and mathematical calculations along with many more. 'The Commodore 64 BASIC Handbook' is a dictionary-style handbook describing BASIC vocabulary. Short sample programs illustrate the use of each command. 'Your First VIC 20 Program' is designed for the beginner. Illustrations and diagrams enable the reader to learn enough BASIC to begin programming. All of these books are published by Sybex and are available from The Computer Bookshop, 30 Lincoln Road, Olton, Birmingham B27 6PA telephone 021 707 7544.



## VIC-20 Computer Program Writing Workbook

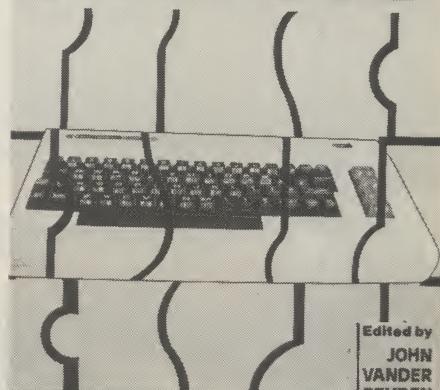
Handy BASIC program writer's notebook of 80 forms you need to make software writing easy and fun, with a speed reference guide to BASIC and graphics, for users of the Commodore VIC-20, Commodore Model 64, PET, and all other Commodore computers.



by Howard Adler

'The Elementary Commodore 64' teaches the reader to use and program the computer. Learn to load and save programs on cassette or disk, edit programs, create graphics and music and many other handy utilities. The cost of the book is 12 pounds and 70 pence and it is published by Prentice-Hall International, 66 Wood Lane End, Hemel Hempstead, Herts. HP2 4RG.

## VIC 20 EXPOSED

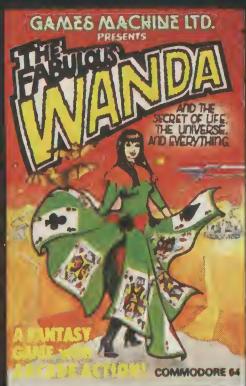


Edited by  
JOHN  
VANDER  
REYDEN

**Programmers Reference Guide**  
This guide can be used by complete novices and experienced programmers. It contains aspects of both BASIC and Machine Language programming and includes tips to help use the CBM 64. Features for the beginner include a description of each BASIC command plus example programs and for the advanced programmer it has a CBM 64 memory map and a list of the KERNAL entry points. £9.95. Available on mailorder from Vicsoft. Tel: 0753 73638.

# GAMES MACHINE

## And now for something completely different...



### THE FABULOUS WANDA AND THE SECRET OF LIFE THE UNIVERSE AND EVERYTHING

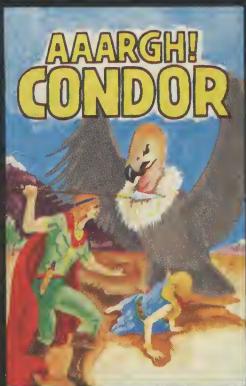
An adult fantasy game with Arcade Action

You are travelling far from home looking for good times around the Universe, when you are intercepted by the evil Brutus of the Federation. Brutus forces you to go and seek the Secret of Life, the Universe and Everything - known only to the Fabulous Wanda, a hostess in the Spaced-Out Inn in Highsville on the planet COPUS. You are teleported down to Highsville where the Customs man demands money for Teleport Tax.

There is a video game in the Terminal with 3 credits left.

Now you are on your own and you must decide how to proceed to Highsville Mainstreet to find the various establishments to enter and ...

£7.95



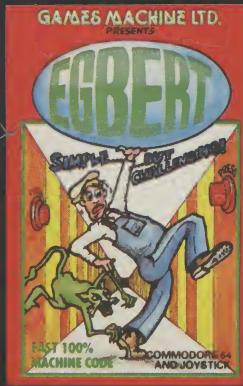
### AAARGH! CONDOR

George falls into a day-dream whilst sitting comfortably in his armchair smoking his pipe.

A scene floats in front of him of a landscape with trees and a mountain in the background. A damsel lies helpless having fallen down the mountainside. A strange vulture-like bird is flying down to seize the damsel and carry her off. The damsel is now becoming hysterical and frantic with fear - George knows what he has to do ...

George at once becomes the hero but he has many hazards to overcome including deadly arrows from the local warrior, deadly creatures and eggs carefully aimed from the air. Can George make it to the top of the mountain to take the spear and kill the bird? *Will George finish the game before he drops his pipe and burns the house down?*

£7.95



### EGBERT

A fast Arcade Action Game for all the family to play. Written in 100% Machine Code for super-fast action!

Egbert works on the production line at 'LEYSPACE'. It was a comfortable life until the invasion of the TEBBITES from the planet TOR. Egbert's union has been exterminated and the TEBBITES have left their deadly Pets running wild in the workplace. As if that wasn't enough, the evil invaders have forced Egbert to take care of an Egg - damaging the Egg will have fatal consequences for poor Egbert. Egbert is now on piecework - can he earn a decent wage? Can he even survive? **WARNING!** You may get an ulcer by playing this game.

#### SIX LEVELS OF SKILL.

**ANYBODY WHO CAN DO LEVEL 6 SHOULD WRITE AND LET US KNOW!**

£7.95

## New and original games for the COMMODORE 64



Also available soon  
games for STACK LIGHT RIFLE

GAMES MACHINE LTD.

Business and Technology Centre, Bessemer Drive, Stevenage, Herts. SG1 2DX

Telephone: (0438) 316561 Telex: 825824

Please add 50p to cover post and packing.

I enclose a cheque/P.O. payable to GAMES MACHINE LTD., for £

or debit my Access/Barclaycard account no. \_\_\_\_\_

Signature \_\_\_\_\_

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_



	QTY.	£
WANDA		
CONDOR		
EGBERT		
TOTAL		

SEND TO:-  
GAMES MACHINE LTD.  
FREEPOST  
STEVENAGE  
HERTS. SG1 2YH

DEALERS AND DISTRIBUTORS REQUIRED. GAMES AND EDUCATIONAL PROGRAMMES WANTED FOR ANY HOME COMPUTERS.

# Educational software

Convinced that a child of your acquaintance is spending far too much time zapping aliens instead of carrying out tasks that teachers might have set? There's one simple solution – schoolwork that's also fun. Here we give a few examples from the large range of software.

## English Language

Material provided by International Correspondence School (ICS) tutors and covers the GCE/CSE syllabus. Covers Composition, Summary, Comprehension, Spelling, Grammar and a General test. Comes on two cassettes for the CBM 64. £9.99.

## Biology

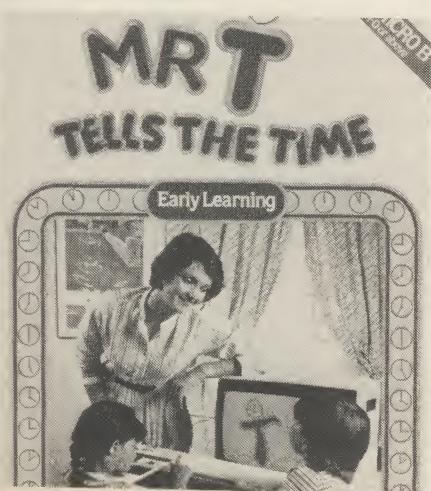
Material supplied by the ICS and follows the GCE/CSE syllabus. Covers nutrition, respiration, nervous system, the circulatory system, excretion, movement, reproduction and the Biology of the Environment. Supplied on two cassettes for the CBM 64. £9.99.

## Geography

Follows the GCE/CSE syllabus and covers climate, farming and rural settlement, industry and power supplies, transport and trade and population and towns in Great Britain. Various world topics are also included. Supplied on two cassettes for the CBM 64. £9.99.

## Mathematics I

Tests knowledge of arithmetic, algebra, geometry and trigonometry and ends up with two tests of short and long questions.



It contains a mixture of modern and traditional mathematics. Comes on two cassettes for the CBM 64. £9.99.

## Mathematics II

Similar to Mathematics with ICS data. Concerned more with traditional mathematics covering arithmetic, equations, progressions, functions, calculus and trigonometry. Contained on two cassettes for the CBM 64. £9.99.

## History

Follows the GCE/CSE syllabus and covers the following topics; The two World Wars, Peace and Democracy, Totalitarianism Empires and the Commonwealth, both Communist and Capitalist Bloc countries, Great power relations and Emerging nations. Contained on two cassettes for the CBM 64. £9.99.

## Physics

Material gathered with help of an Educational publishers. Covers charges and circuits; electricity and magnetism; electronics and nucleonics; waves and sound light; matter; forces and motion. Comes on two cassettes for the CBM 64. £9.99.

## Chemistry

Program covers Basic techniques; the Periodic tables; Structure; Binding and Energy; Redox reactions; Acids, bases

and salts; Reactions and their rates; Analysis and Organic Chemistry. Comes on two cassettes for the CBM 64. £9.99.

## Test and Match Series

Four packages included in this series especially for the 5-8 year olds. ARITHMETIC I shows how to do simple addition and subtraction using numbers from zero to ten. ARITHMETIC II shows how to simple multiplication and division. ALPHABET introduces the child to the lower and upper case letters and VOCABULARY helps to increase a child's word power by displaying labelled pictures of familiar objects which need a word to be entered that is associated with each part of the picture. Each one comes on cassette for the Vic 20 (8 or 16K) and costs £9.99.

## Test Your Child Series

Five programs designed for children aged 8-11 in the form of tests. GENERAL KNOWLEDGE comes in the form of quizzes covering general knowledge and nine specialist topics including food, drink, history and travel. SPELLING I and II test the spelling capabilities of a child by asking child to identify incorrectly spelt text. ARITHMETIC covers addition, subtraction, multiplication, one line and long division, fractions and decimal numbers. READING tests child's literary ability. Each program comes on cassette for the Vic 20 (8 or 16K) and costs £9.99.

# Program time

## Educational Software

Several programs for the young child and the CBM 64. Mr T Tells The Time is made up of four separate games that will help the child to tell the time. Mr T's Shape Games enables the young child to recognise and recite names of shapes. Mr T's Measuring Games helps the child observe, compare and understand lengths and heights. Mr T's Money Box

helps your child understand the intricacies of our coinage system. Mr T's Alphabet Games lets the children practice their alphabet and Mr T's Number Games helps the child to learn to count the numbers one to nine. All of these cost £12.95 each and are available from Ebury Software, 72 Broadwick Street, London W1V 2BP. Telephone: 01-439 7144.

# Keeping it tidy

Trays, cases, cabinets, files, boxes ... there's a huge range of accessories which are useful and attractive - two necessary qualities for the ideal gift. We've taken a lucky dip into what's available ...

#### Disk Pack Carrying Case

A black foam rubber lined transport case for disk packs and disk cartridges. The outer casing is made of robust plastic and has double locks. Three removable cushions provide secure packing and can hold three cartridges or one disk pack. £90.73. From Stralfors Data Products, Unit 11, Techno Trading Estate, Bramble Road, Swindon.

#### Tape Carrying Case

A black robust plastic transport case for magnetic tapes. It is lockable and has removable partitions and label holders. Has a capacity of six magnetic tapes. £59.50. From Stralfors Data Products, Unit 11, Techno Trading Estate, Bramble Road, Swindon.

#### Compuicolor

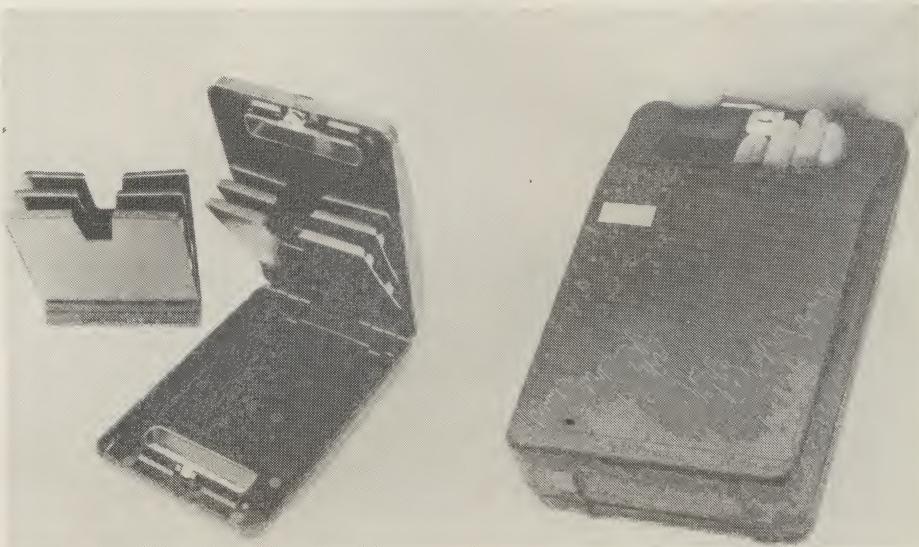
A marking system based on digit and colour combinations for racking. Useful in any library system and supplied in sets of 1000. Each set contains labels for marking the reel, the case and the racking. £88.00. From Stralfors Data Products, Unit 11, Techno Trading Estate, Bramble Road, Swindon.

#### Cassette Carrying Case

Two cases made of tough washable black plastic with individual divisions for the cassettes. One holds 16 cassettes at £3.25 and one that holds 32 cassettes at £4.99. Available on mail order from Vicsoft. Telephone: 0753 73638.

#### Antler Hard Case

Designed to carry six tapes with space for the computer, tape machine and a compartment for plugs, leads, transformer and a modulator. The computer can be used from within the case. Moulded in black a.b.s. plastic with a cushion grip handle and a blue brush nylon surface inside. £42.50. By Antler Specialist Cases Division available on mail order from Vicsoft. Telephone: 0753 73638.



Handy and portable disk storage from Inmac.

#### Floppy Manager

An interlocking storage system with modules that interlock for either the 5 1/4 or 8 inch diskettes. Each case holds up to ten diskettes in a dust free environment and can be stacked together on a bookshelf, in a file drawer or on a desk. For access a tray automatically flips forward when the storage system is opened. Made of beige coloured polystyrene. The 5 1/4 inch: 6.50 and the 8 inch: 6.75. Available from Inmac (UK) Ltd, Davy Road, Astmoor, Runcorn, Cheshire. Tel: 09285 67551.

#### Diskmate

A floppy disk filing system. A dark brown plastic case with a smoked, hinged lockable lid. 80 sets of suspension clips hold the 5 1/4 inch floppy envelopes and once the retaining bars are closed the disks cannot fall out. It comes with 20 wordprocessing and 20 data processing cards which enable the user to record details about the diskette contents. 37.00. Available from Inmac (UK) Ltd, Davy Road, Astmoor, Runcorn, Cheshire. Tel: 09285 67551.

#### Floppy Disc Media Storage

A data storage binder supplied with one panel for the storage of ten 5 1/2 inch floppy disks. Also contained are ten dividers for the filing of hard copies and ten plastic pockets for the storage of program instructions. Folds flat like an ordinary binder £9.99. Made by Esselte Accessories and supplied by Vicsoft. Tel: 0753 73638.

#### Diskette Storage Box

A storage box made of brown antistatic plastic with a smoked tinted cover. A lock is moulded into the box and the lid is hinged so that it remains open without support or can be removed completely and the tray stacked inside. Boxes are available for the 5 1/4 inch and 8 inch diskettes and for the two alternative capacities, 40 or 80 diskettes. Cost: 40×5 1/4: £16.25, 80×5 1/4: £23.00, 40×8: £22.25, and 80×8: £29.50. Available from Stralfors Data Products, Unit 11, Techno Trading Estate, Bramble Road, Swindon. Tel: 0793 37837.

# CHRISTMAS GIFTS

## Transport Case

A case with space for carrying thirty 5½ inch disk. A very strong green case of glass reinforced polyester with a numbered lock. Each of the six floppy drawers has spacers designed to accept five floppy disks. Three drawers can be removed to make room for other items. £34.00. Available from Inmac (UK) Ltd, Davy Road, Astmoor, Runcorn, Cheshire. Tel: 09285 67551.

## Mini Cartridge Leaf and Binder

The DC 100 A cartridges can be stored in a white plastic leaf capable of holding 6 mini data cartridges. Each one is secured by a moulded dimple and this leaf clips into the triple D-ring binder for neat storage. £7.50. Available from Inmac (UK) Ltd, Davy Road, Astmoor, Runcorn, Cheshire. Tel: 09285 67551.

## Cassette File

Made of reinforced plastic, this file has space for storing cassettes in 18 protective cells. The tray is slanting at an angle and the file is protected from contaminants by a sleek, smoke-tinted top. £33.00. Supplied by Inmac (UK) Ltd, Davy Road, Astmoor, Runcorn, Cheshire. Tel: 09285 67551.

## Mini Data Cartridge Tray

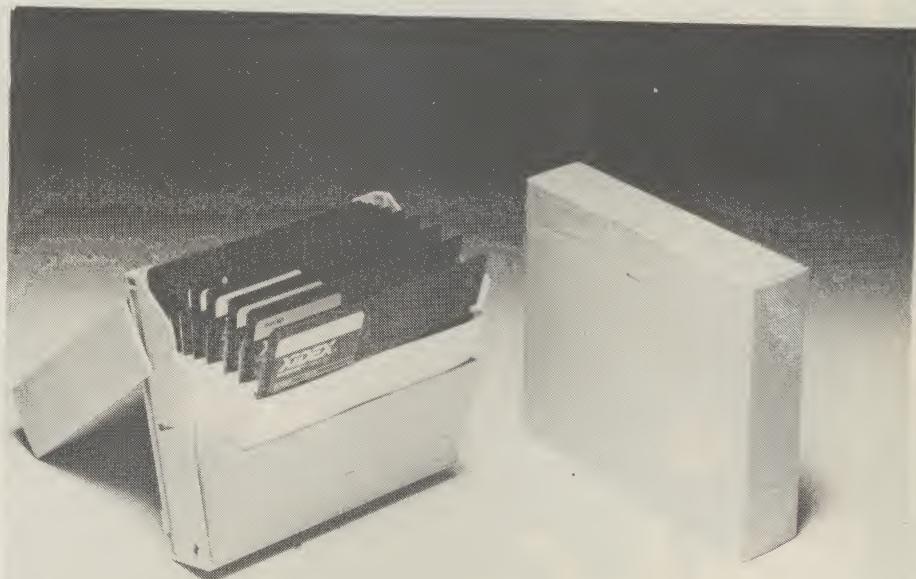
A tray capable of storing up to 24 mini-cartridges. It has a smoked transparent acrylic top which tilts open with slanted plastic storage shelves. One year guarantee. £29.00. Supplied by Inmac (UK) Ltd, Davy Road, Astmoor, Runcorn, Cheshire. Tel: 09285 67551.

## Diskette Storage System

A red easel ring binder which can hold up to 10 frames of vinyl pockets with space for 5 diskettes in each frame. It can be folded back to form an easel effect £12.95. Available from Stralfors Data Products, Unit 11, Techno Trading Estate, Bramble Road, Swindon. Tel: 0793 37837.

## Conquest Soft Case

A light-weight, compact carrying case which can transport the CBM 64 computer, a C2N cassette drive and a power pack in the lower part of the case. Software can be kept in the flap. £15.95. By Conquest and available on mail order from Vicsoft. Telephone: 0753 73638.



## Diskette Storage Boxes

The SEE 10 box stores 10 floppy disks enabling the user to remove disks without damaging the others. The box stores 5½ inch disks and is available from BFI Electronics Limited, 516 Walton Road, West Molesey, Surrey KT8 0QF. Telephone: 01-941 4066.

## 3-Drawer Cassette Storage Cabinet

A cabinet with a capacity for 36 cassettes that can be stored away in three drawers. Several cabinets can be stored if required. Has a woodgrain finish. £9.99. Made by Cambra and available from Vicsoft. Tel: 0753 73638.

## Cassette Storage Cabinet

A study unit with a woodgrain finish and a hinged smoky perspex lid. Holds 33 cassettes in individual dividers £8.49. Made by Cambra and available from Vicsoft. Tel: 0753 73638.

## Library Case

A beige polystyrene case for the storage of floppy disks - 5 and ½ or 8 inch, with a pop up feature to put them in full view. Tabs and tab insets are provided for labelling and identification purposes. 5½ inch minifloppy disk: £3.50 and 8 inch disk: £4.50. Available from Inmac (UK) Ltd, Davy Road, Astmoor, Runcorn, Cheshire. Tel: 09285 67551.

## Pop Cassette Carrying Case

A carrying case for up to 36 cassettes made in a tough plastic. Available in bright colours e.g. green and yellow £3.50. Made by Cambra and supplied by Vicsoft. Tel: 0753 73638.

## Cassettes

Blank data cassettes costing £5.95 are suitable for use in all popular home computers. Free library case with every cassette. From Startech, 208 Aigburth Road, Aigburth, Liverpool L17. Telephone: 051-727 7267.

## Filing Tray

A yellow tray which can hold up to one hundred 8 inch diskettes. Divided into five separate compartments. £8.50. Available from Stralfors Data Products, Unit 11, Techno Trading Estate, Bramble Road, Swindon. Tel: 0793 37837.

## Diskette Desk Stand

For either 5½ or 8 inch diskettes, up to 30 diskettes can be stored in this stand. They are stored in transparent vinyl pockets which makes the identification of the diskettes simpler. Colour labels are supplied. 5½ inch: £34.00 and 8 inch: £38.00. Available from Stralfors Data Products, Unit 11, Techno Trading Estate, Bramble Road, Swindon. Tel: 0793 37837.

### METAGALACTIC LLAMAS BATTLE AT THE EDGE OF TIME

A fast and original game for the unexpanded VIC. Challenging and colourful, with good sonics and a unique game action and design, this promises to be the most exciting new 3.5K VIC game since the introduction of GRIDRUNNER nearly a year ago.

£5.50

### LASER ZONE

Experience Laser Zone - an utterly NEW totally ORIGINAL masterpiece of Video games design. Learn to control two spaceships at once. Feel the EXHILARATION as, after long hours of practice, you control the two ships so that they function as a smooth, co-operative team! Feel the raw POWER as you lunge for the electro button and BLAST your enemies into expanding clouds of SPACE JUNK! Feel the humiliation as a carelessly aimed BLAST slams into the side of your last remaining ship! 8K expansion required.

Available for Commodore 64 £7.50 and VIC-20 £6.

### ATTACK of the MUTANT CAMELS

Planet earth needs you! Hostile aliens have used genetic engineering to mutate camels from normally harmless beasts into 90 foot high, neutronium shielded, laser-spitting death camels! Can you fly your tiny, manoeuvrable fighter over the mountainous landscape to weaken and destroy the camels before they invade the humans stronghold? You must withstand withering laser fire and alien UFOs. Game action stretches over 10 screen lengths and features superb scrolling, scanner 1/2 player actions and unbelievable animation! Play this game and you'll never be able to visit a zoo again without getting an itchy trigger finger! Awesome m/c action!

Available for Commodore 64 £7.50.

### HOVER BOVVER

A totally original arcade game for C64 featuring outstanding graphics and a sound track created by a professional Piano Wizard. Gordon Bennet has borrowed his neighbour's Air-Mo lawnmower. Mow your way through as many of the 16 lawns as you can before the pursuing neighbour retrieves his mower. Set your dog onto the neighbour to help you out of tight spots and don't annoy the gardener. Try not to plough through the neat flower beds or overheat your mower!

£7.50

### MATRIX

Jeff Minter has taken Gridrunner - the game that topped bestseller charts in USA and UK - and created an awesome sequel. Graphically superb, it features multiple screens, new aliens and attack waves, mystery bonuses, renegade humanoids, deflexor fields, diagonal tracking, countdown/panic phase and much, much more...

Packed into 20 mind-zapping zones and accompanied by incredible sonics.

8K expansion required:  
Available for Commodore 64 £7.50 and VIC-20 £6.

### ABDUCTOR

A classic new space game! ZAP the swirling alien hordes before they ram you - and abduct your humanoids! Survive the assault for long enough and you'll get an extra stage on your spaceship with double firepower! Awesome unexpanded VIC Action.

£5.00

### GRIDRUNNER

Finally true arcade quality on the unexpanded VIC! Shoot down the segmented DROIDS invading the grid. Beware of the pods and zappers! The awesome speed, sound, and graphics gives you the best blast available for unexpanded VIC. Available for VIC-20 £5.00 Commodore 64 £5.00 Atari 400/800 £7.50

All orders add  
50p postage and packing



# Lamsoff

AWESOME GAMES SOFTWARE

49 MOUNT PLEASANT,  
TADLEY, HANTS. RG26 6BN.  
TELEPHONE: TADLEY (07356) 4478

49 MOUNT PLEASANT,  
TADLEY, HANTS. RG26 6BN.  
TELEPHONE: TADLEY (07356) 4478

# games galore!

## GALACTIC SOFTWARE

**BUG DRIVER** – the beetle has to outswim the merciless bug eating fish while trying to steal their eggs. Available on cassette for the CBM 64 or the Vic 20 and used with either a keyboard or a joystick. £5.50.

**ROBOT MOUSE** must collect atomic cheese from the floor of a space maze. Malfunctioning robots try to prevent the mouse's progress. Supplied on cassette for the unexpanded Vic 20 and uses a keyboard or joystick. £5.50.

**NEUTRON ZAPPER** – the player must pilot a space ship through the galaxy and survival against the dangers depend on fast reflexes. Available on cassette for the unexpanded Vic 20 and uses a keyboard or joystick.

**3D-MAZE** is a game based on using wits as the player finds a way through the three dimensional maze. A time factor is an added difficulty. Comes on cassette for the unexpanded Vic 20 and uses a joystick or keyboard. £5.50.

**SPACE SHUTTLE** – the player must rescue psychopathic scientists from the moon. Hazardous space fragments provide a challenge. Comes on cassette for the unexpanded Vic 20 and uses a joystick or keyboard. £5.50.

Commodore have produced two games for business people.

**LOBSTER CATCHER** – a business game where the player is owner of a lobster fishing fleet and must anticipate good and bad weather conditions in deciding the best situation to lay heavy or light weight pots. Decisions are important. Available on cassette for the CBM 64 and needs a keyboard. £11.99.

**FROGGY** – the frogs have to cross a road and avoid trucks and cars. Then the river must be traversed with its boats, logs, turtles and lilyponds. Comes on cassette for the Vic 20 and the CBM 64 and played with a keyboard or joystick. £5.50.

**HIGH FLYER** is where the player is managing a small air company and must expand it into a multi-million concern using business acumen. Decisions must be made with airline schedules, the type of aircraft to be used for the most profits, borrowing money etc. Comes on disk for the CBM 64. £11.99.

Thorn EMI have released a series of wargames for the Vic 20.

**TANK COMMANDER**. The player's mission is to drive a single tank over enemy lines and blow their supply dumps up. Rough roads and ambushing enemy tanks are a threat. One or two players can participate. Available on cartridge for the Vic 20 (3k) and either a keyboard or joystick. £24.95.

**MINE MADNESS**. Gold has been discovered in an abandoned mine and players must get it to the surface by moody elevators. Mine monsters and rock falls and a mysterious force contribute to the difficulties. One or two players. Supplied on cartridge for the Vic 20 (3k) and used with a joystick or a keyboard. £19.95.

**COMPUTER WAR** is based on the film 'War Games' and the alarm bells have sounded at the North American Defence System. A Thermonuclear attack is signalled, the player realises it is simulated, but the computer does not and the national defence system is in action. The player must crack

the code, track and destroy simulated enemy missiles before the world's total destruction. Supplied on cartridge for the Vic 20 and needs a keyboard or joystick. £19.95.

**SUBMARINE COMMANDER**. The player is in command of a submarine patrol and must destroy all the enemy ships. The Sonar can detect ships under water and the submarine can dive and rise to periscope level. The instruments must be checked and enemy destroyers are on the alert. Available on cartridge for the Vic 20 and uses a keyboard or joystick. £24.95.

**RIVER RESCUE**. The player is in control of a patrol boat and wants to rescue a team of explorers lost in the jungle and collect the reward offered. Navigation is difficult, and obstacles must be shot or avoided. Comes on cartridge for the Vic 20 (16k) and needs a joystick. £19.95.

**MUTANT HERD**. A power house is being threatened by hordes of crazy mutants. The player assumes the role of a Mutant Slayer and uses two lasers to keep them back whilst trying to find their burrow mouth. The mutant eggs inside must be destroyed, but there is a detonator fixed to them. One or two players. Comes on cartridge for the Vic 20 and uses a keyboard or joystick. £19.95.

**MEDIEVAL JOUST**. Here the player challenges the kings knights to a tournament. After

# CHRISTMAS GIFTS

the first one the player must then fight seven at one time. Three skill levels are available. Comes on cartridge for the Vic 20 and controlled by joystick or keyboard. £19.95.

## CHANNEL 8

ASTRAL ZONE gives you two neutronium cannons mounted on a terramobile and a magnetic phase shield are all the player has with which to defend the earth from Vengorian fighters. It has 3-D graphics and sound. Comes on cassette for the CBM 64 and requires one joystick. £9.95.

LANDER – as a Trainee Space Commander, the player has to pass various landing tests before being awarded his wings. It is important to land successfully on all the zones. Four scenes and three levels add to the difficulties. Available on cassette for the CBM 64 and needs a joystick. £9.95.



## MAINCOMP

BATTLE OF BRITAIN is a war game in which the aim is to reduce the German Luftwaffe so that it can longer pose a threat to Englands major industrial cities. 12 fighter squadrons are available for the player to use. Supplied on cassette for the Vic 20 (16k) and requires a keyboard. £9.50.

A.L.I.C.E IN W.U.N.D.E.R.-LAB takes place in a Nuclear Defence laboratory where the new reactor has been sabotaged. Meltdown will occur unless the player can move back through time and undo the damage. H.G. Wells has the key to a time machine, but he is in a maze drunk. There are three levels of difficulty. Comes on cassette for the CBM 64 and played with a keyboard.

BRAIN STRAIN is based on the Mastermind Peg Game. The computer selects a secret code and the player must try to break the code in 10 attempts. Three levels of difficulty. Comes on cassette for the CBM 64 and played with a keyboard.

## IMAGINE SOFTWARE

CATCHA SNATCHA is based in a super-store with housewives doing their shopping. The player assumes the role of a shop detective. Collecting lost property, lost kids and dealing with bomb scares are all part of the game. Available on cassette for any Vic 20 and requires a keyboard. £5.50.

ARCADIA-64 – the Atiaran fleet are poised to attack and the player manning the Arcadia must repel them. An intergalactic battle played on several levels. Available on cassette for the CBM 64 or the Vic 20 and needs a joystick. £5.50.

BEWITCHED – Mordread has cast a wizard into his dungeons and transformed him into a key. He must escape by opening four sets of doors while fighting the ghosts and ghouls. Involves changing colour to match the doors. Comes on cassette for the Vic 20 and played with a keyboard. £5.50.

## MANDATTA

TAXMAN is a variation on a popular theme. The player must rush around eating as much money as possible while the taxmen chase and try to bankrupt him. 6 levels of play. Available on cassette for the CBM 64 and played with a keyboard or joystick. £5.65.

SUPER COPTER – the player assumes the role of commander of a supercopter. The aim is to land on an island and defuse a nuclear bomb ready to go off. Hazards abound; laser screens, radar balloons and air missiles. Supplied on cassette for the CBM 64 and played with a keyboard. £5.65.

ENVAHI – an invasion force is attacking a giant dam above a city which supplies water and hydro-electric power to the people. The player is controlling a helicopter gunship and must protect the people from the enemy. Comes in cassette for the Vic 20 (8K) and can be played with a keyboard. £6.95.

## GAMES MACHINES

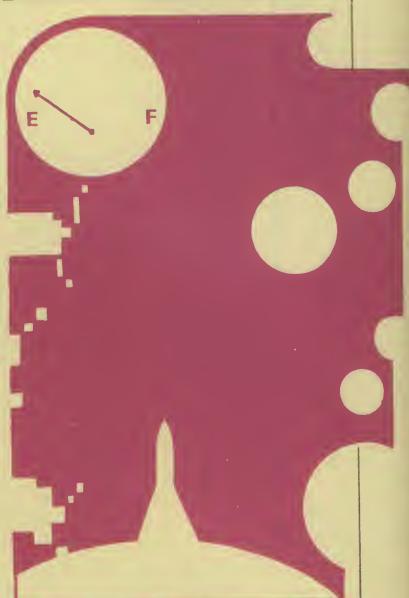
THE FABULOUS WANDA is an adult fantasy game! The player is wandering round the universe looking for fun and is forced by the evil Brutus to seek the secret of life, the Universe and everything, known only to Wanda. Wanda must be sought on the planet COPUS. Comes on cassette for the CBM 64 and played with a keyboard. £7.95.

EGBERT is a game with more than a bit of humour. The TEBBITES have invaded and Egbert who was working on the production line at LEYS-PACE is being plagued by deadly pets. Egbert must take care of a egg and any damage to it could be fatal. He must also earn a decent wage to survive. Comes on cassette for the CBM 64 and requires a joystick. £7.95.

## VIRGIN GAMES

FALCON PATROL – the sole survivor of the Falcon patrol must stop jets attacking oil installations and refuelling bases. The jet is armed with 100 missiles and a radar. The game gets progressively more difficult. Available on cassette for the CBM 64 and needs a joystick. £6.95.

BRITMANIA is set inside the data-bus of the '64.' The player must get past a neutron flow and reach the central core. A laser cannon is used to shoot BITS sent out by the C.P.U. Once shot a BIT mutates into a POD. There are several levels. Available on cassette for the CBM 64 and needs a joystick. £6.95.



## LYVERSOF

LUNAR RESCUE is a game in which the aim is to rescue three marooned scientists from the moon by landing a rescued aircraft while a meteor storm ranges. Comes on cassette for the unexpanded Vic 20 and uses a keyboard or joystick. £5.95.

DEMON DRIVER players have a phobia about cats and if one crosses the road it has to be run over. Unfortunately the cats have their friends who come to their aid. Supplied on cassette for the unexpanded Vic 20 and played with a keyboard or joystick. £5.95.

CRAZY CLIMBER AND APPLE BUG are two games in one package. In Crazy Climber the player must climb scaffolding and grab floating balloons and in Apple Bug the player must eat life saving apples and watch out for the bugs. Comes on cassette for the unexpanded Vic 20. £5.95.

# CHRISTMAS GIFTS

COMPENDIUM 1 is another double package. In GRAND PRIX the player has to try and win a race and in NUCLEAR ATTACK the player has to defend the city from the ICBM. Comes on cassette for the unexpanded Vic 20 and played with a keyboard or a joystick. £5.95.

COMPENDIUM 2 is the second in the Compendium series. Based on the TV game HI-LO which involves placing bets and in HEARTS AND DIAMONDS diamonds maraud around and hearts must be protected.

## ANIROG

GALACTIC ABDUCTOR has a scenario in which the Earth is being attacked by a team of giant space hawks. They attack satellites, drop dangerous pods and carry off humanoids. A lot of accurate shots are needed to save everything. Comes on cassette for the VIC 20 (16K) and is played with a joystick. £7.95

MOON BUGGY is all about the Moon Buggy patrol who are attacked by fighters in a star cruiser. The buggy must manoeuvre over lunar rocks, across craters and destroy the alien foe. Landscape changes constantly. Available on cassette for the CBM 64 and needs a joystick. £7.95.

LAB DAB – Sam the Painter must paint a large area with a little pot that constantly needs refilling. Disturbed wood-worms come out of hiding and chase him, fortunately they can only move in the painted areas. The worms get progressively cleverer. Comes on cassette for the unexpanded Vic 20 and can be played with a keyboard or a joystick. £5.95.

KRAZY KONG has abducted a maiden and trapped her at the top of his lair. The player must jump over barrels while climbing scaffolding and ladders to rescue her. Each of the four screens presents different obstacles. Supplied on cassette for the Vic 20 (16K) and played with a keyboard or a joystick. £7.95. (KONG is a similar game for the CBM 64).

SKRAMBLE – the earth has finally been taken over by the Cobrons and they have left the government in charge of its command module. A fighter plane on a suicide mission must destroy the base which has a formidable defence system. Comes on cassette for the CBM 64 and needs a joystick. £7.95.

THE DUNGEONS is an adventure game where Dragons and Monsters are guarding the magic basket containing the secrets of the Lower Dugeons. The role of fighter or magician can be assumed and there are over 100 chambers to explore. Comes on cassette for the Vic 20 (16K) and played with a keyboard. £5.95.

HEXPERT – the evil witch ZOGANAAR has forced Bert to play on her 3D hexagonal pyramid. He must jump around on the steps and avoid large balls. COILY the snake is also a threat and must be lured to his death. Comes on cassette for the CBM 64 and is played with a joystick. £5.95.

## MR CHIP



JACKPOT is a computerised version of the fruit machine. The combinations are similar to the ones in the arcades and the good ones win money, for example four bells wins the player two pounds. Each go costs ten pence. Supplied on the cassette for the unexpanded Vic 20 and played with a keyboard. £5.50.

KWAZY KWAKS – The object of the game is to shoot all the targets in the shooting gallery before the time runs out or before the bullets are all lost. Eight different speed levels provide more challenges. Supplied on cassette for the Vic 20 and can be played with a joystick or a keyboard. £5.50.

PACMANNIA has several options for the player to choose from: Key Control, a Visible or invisible maze, still or moving Power Pills, Dots or Crosses. There are three lives per game. Supplied on cassette for the Vic 20 (3k) and can be played with a keyboard. £5.50.

THREE GAMES is a cassette with three games of chance: Mini-Roulette, Pontoon, and Hi-low. Computerised versions of these casino games. For the Vic 20 and played with the keyboard. £5.50.

WESTMINSTER is all about democracy. Up to four players can play and emulates the processes in the general election. The player has to lead a party and tour through 60 constituencies buying votes in order to win. Supplied on cassette for the Vic 20 and played with a keyboard. £5.50.

LUNAR RESCUE – the player is in a mothership attempting to steer down onto a landing pad avoiding the meteors. These change into aliens adding to the difficulties. Three lives per game. Comes on cassette for the CBM 64 and played with a keyboard or joystick. £5.50.

## MERLIN SOFTWARE

CRAZY CAVEMEN – long ago a sabre tooth tiger ambushed and scattered a hunting party. The player is one of these hunters and has to return home. The journey is beset with hazards with Rolling Rocks, Dinosoars, Dodos and Prehistoric Birds. Available on cassette for the CBM 64 and needs a joystick.

BLUE MOON puts you in charge of a spaceship. The player must rescue the sister-

ship and crew, trapped on a hostile planet and take them to the Blue Moon. During the journey, Comet Storms, Blue Bouncers and a Tecom Man are hazards to be negotiated. Comes on cassette and is played on the 64 with a joystick.

## LLAMASOFT

HOVER BOVER – Gordon Bennet has borrowed his neighbours FLYMO lawnmower and has to mow through as many of the 16 lawns as he can before being caught. Dogs, gardeners and overheated mowers are obstacles to be negotiated. Supplied on cassette for the CBM 64 and played with the keyboard. £7.50.



ATTACK OF THE MUTANT CAMELS is a popular game in which aliens have captured and mutated some camels into 90 ft high laser firing beasts. The aim is to pilot a spaceship and destroy them. Various of the game parameters can be altered and there are 31 skill levels to be negotiated. One or two players with joystick. Available on cassette for the CBM 64. £7.50.

# CHRISTMAS GIFTS

## ALLIGATA



**SQUASH A FROG** is a version of the arcade game. The frog must traverse a motorway with fast traffic, a river bank full of snakes and a river with snakes, alligators and submerging turtles. Comes on cassette for the CBM 64 and played with a keyboard or joystick. £7.95.

**BAT ATTACK** – the player is being attacked by killer bats first and then by clusters of asteroid discs. The game gets progressively faster and increasingly difficult. Comes on cassettes for the CBM 64 and played with a keyboard. £7.95.

**AZTEC TOMB** is an adventure game set in the Amazon forest. The aim is to find the lost Aztec tomb. The screen is divided into graphics and text. Supplied on cassette for the CBM 64 and needs a keyboard. £7.95.

**BALLOON RESCUE** – A balloon has a low fuel level and the player must move it through a maze of rocks and caves to find some cylinders. The pull of gravity is an obstacle. Available on cassette for the CBM 64 and played with a keyboard or a joystick. £7.95.

**DAMSEL IN DISTRESS** – the player has been weakened by poison and must rescue the princess who has the antidote. Hazards on the approach include building a bridge, menacing soldiers, ghosts and collecting diamonds. Supplied on cassette for the CBM 64 and played with a keyboard or joystick.

**BRANDS** is a motor racing game. The player has to manoeuvre a racing car through the streets. Points are won for overtaking other drivers, avoiding obstacles and night driving. Available on cassette for the CBM 64 and played with a keyboard. £7.95.

**HAUNTED HOUSE** is set, of course, in a haunted house with men appearing through doors and Spooky the ghost must capture enough souls to save himself from eternal damnation. They can be caught straight away or in the maze. Comes on cassette for the CBM 64 and used with a keyboard. £7.95.

## MR MICRO

**BENGO** the eskimo has to be protected from a half witted aggressive Yeti. Blocks of ice can be used to throw at the Yeti for protection. Comes on cassette for the unexpanded Vic 20 and played with either a joystick or a keyboard.

**AMIGO** – the bandits are chasing Amigo and he must escape by running round blocks and into various corners of the city. They have got guns but Amigo hasn't. Supplied on cassette for the Vic 20 (8 or 16k) and used with a joystick. £6.90.

**HUMPHREY** must land on all cubes and change their colour, but he is being chased by an atomic bomb. Comes on cassette for the Vic 20 and can be played with a joystick or keyboard. £6.90.

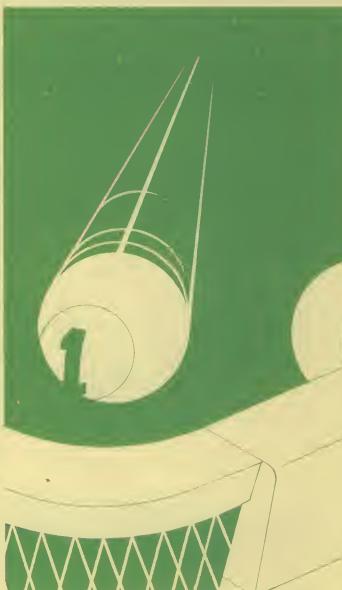
**MYSTERIOUS ISLAND** – a prisoner has escaped from prison in a hot air balloon and must land on Mysterious island. Hazards include booby trapped minefields, killer bees, and force fields. Supplied on cassette for the Vic 20(16k) and played with either a joystick or keyboard.

**DIGGER** – the remote viewer shows the professor's path and the players must control the digger to collect rare gems. These are protected by Micro-nits and a stalactite could cause problems. Comes on cassette for the Vic 20 (8 or 16k) and needs a joystick. £6.90.

## L.D.S. SOFTWARE

**MULTI-PACK** is a package which contains three games – Nine Mens Morris, Gammon 64 and Cymon. Gammon 64 is the computerised version of backgammon and can be played with the computer or another person. Nine Mens Morris is a two player board game set out like a grid. Each person has nine counters and the game develops into a fight. In Cymon, four colours are represented on the screen with a different sound for each and the aim is to make the longest sequence possible. Available on cassette for the CBM 64 and uses a keyboard. £7.95.

## BUBBLE BUS



**HUSTLER** is written in machine code and using sprite graphics, the program has potential for six games, each catering for one or two players. Music is included. Available in cassette form for the CBM 64 using the keyboard. £5.99.

**ALIEN PANIC** is a fight against time to avoid the alien being. If it catches up the player can dig a hole to try and escape. For the CBM 64 on cassette and can be played with a joystick or the keyboard. £3.99.

**GOLDRUSH** is an adventure program with graphics and a prize of real gold for the successful adventurer. Comes on cassette for the Vic 20 (3.5k) and needs a keyboard. £6.90.

**QUIZZER** is an educational program allowing the user to create and play Quiz tapes. It can keep the score for one or two participants and awards points for correct answers. Supplied on cassette for the CBM 64 and used with the keyboard. £5.99.

**CAVERN RUN** takes you on a journey into the depths of a yet unexplored cavern. The pilot has to make the fuel last for the length of the journey. Available on cassette for the CBM 64 and used with either the joystick or the keyboard. £3.99.

**KRAZY KONG** – the gorilla has snatched three maidens and taken them up to the top of a giant stairway. The player has to rescue them by jumping up steps and over rolling barrels. For the CBM 64, comes on cassette and uses a joystick or keyboard. £3.99.

**EXTERMINATOR**, as the title suggests involves zapping everything in sight – whether it is moving or not. Snakes, spiders, wasps all bombard the player. Supplied on cassette for the unexpanded Vic 20 and can be played with joystick or keys. £3.99. Also available for CBM 64 at £5.99.

**THE CATCH** – alien bombs are bombarding the city and the player has to catch everything to stop the destruction. The game gets progressively faster and more difficult. Uses high resolution graphics and has sound. Available for the unexpanded Vic 20 on cassette and is played with a keyboard or joystick. £3.99.

**ANTIMATTER SPLATTER** – the player has to fire a splatter cannon into the antimatter being dropped on the population. It has to be unpredictable as these bombs are dropped in moving belts. Supplied on cassette for the unexpanded Vic 20 and can be played with a joystick or the keyboard. £3.99.

# EXTENDED BASIC for the COMMODORE 64

At last you can make the most of your CBM 64 with Tunnel Software's new product, featuring

**1** The most versatile sound commands available for any home computer, allowing full music control, using the machine's onboard synthesizer chip: MASTER (ten different parameters), DEFVDC (8 to 9 different parameters), SOUND (3 to 4 different parameters), SID (music sequence control).

**2** Fast sprite handling commands, available in HIRES graphics or TXT modes: SPRITE, DEFMOB, MOBCOL, MOBPOS, MOBFIELD.

**3** Fast versatile graphic commands: MODE (3 text, 2 hi-res graphic video modes), CLG, CLS, MOVE, PLOT, TRIN (triangle drawing), FILL (rectangle filling), DRAW, BORDER, PAPER, COLOUR, DEFCOL, SETMID, INK, etc.

**4** An extremely fast three pass ASSEMBLER using labels, etc. associated commands: OPT, CALL, FREECODE, FREEDATA, CLRDATA.

**5** Other commands: DELETE, RENUMBER, COPY (copy text on hi-res screen to memory), AUTO, OLD, DEFKEY (define any function key/keys, individually) DIR (printed disc directory without sing program) REPORT (report disc status).

**6** Other features: New control codes allow printed output to be sent to printer, print in hi-res, graphics, enter paging mode and change video modes. Ability to read joysticks as control codes.

THE THIRTY SIX COMMANDS CONTAIN SEVERAL OPTIONS, AND FROM THE EQUIVALENT OF AROUND EIGHTY SIX INDIVIDUAL COMMANDS.

Using dedicated memory configurations, the extended basic with built in assembler uses 14K Ram and 8K Video Ram, but it still leaves 39½K (½K less than when switched on) available for the user, even in hi-res graphics mode. (Commodore's version only leaves 24K in hi-res mode.) As standard, all keywords are correctly tokenised to save program space and speed of execution.

THE EXTENDED BASIC (WITH BUILT IN ASSEMBLER) IS AVAILABLE FROM TUNNEL SOFTWARE FOR £14.95

PLEASE MAKE ALL CHEQUES, POSTAL ORDERS, payable to

**TUNNEL SOFTWARE**  
**338 TUNNEL AVE**  
**GREENWICH**  
**LONDON SE10 0PF**  
**TEL: 01-858 0837**

**INTRODUCTORY  
PRICE: ONLY £14.95**

## PRODUCTS FOR COMMODORE

### SPEED UP ANY BASIC PROGRAM WITH OUR COMPILERS

Up to 40 times speed increase, reduced program size.

#### BASIC COMPILERS

**Petspeed Compiler** for 4000/8000 series £125.00

**Integer Basic Compiler** for 3000/4000/8000 series £75.00

#### CROSS-COMPILERS FOR BASIC

**Portspeed**: Compiles source on 8000 series to run on CBM 64 £125.00

**X-64**: Integer compiler compiling on 8000 series giving machine code executable on CBM 64 £125.00

**B-Port**: Compiles source on 8000 series to run on 700/B-128 series £450.00

**X-700**: Integer compiler compiling on 8000 series giving machine code executable on 700/B-128 £450.00

### GIVE YOUR VIC OR 64 FULL IEEE AND RS232

Not a cartridge. Compatible with any software.

**Interpod**: Free-standing interface giving IEEE488 and RS232C capabilities to CBM64/VIC20 £99.95

#### SPECIAL OFFER

Order 5 or more Interpod and get a free Portspeed!

All prices are exclusive of VAT. There is also a small charge for post and packing. Dealer discounts are available on all products except the 700 cross-compilers.

Compilers are supplied ex-stock; Interpod supplied 7-days ex-stock.

#### COMMODORE SOFTWARE

Native compilers for the CBM 64 and the 700/B-128 are available only from Commodore.

**Oxford Computer Systems (Software) Ltd.**  
Hensington Road, Woodstock, Oxford OX7 1JR, England  
Telephone (0993) 812700 Telex 83147 Ref. OCSL



**VISA** ACCEPTED

**'SIMPLY WRITE'**: the kind of word processor you didn't think you could afford. Some £300 programs have fewer facilities. Tape or disk; any printer; any 40 or 80 column PET. Needs 16K. Tape £40, disk £45.

**'SIMPLY FILE'** Records System (DBMS). Selects by any key. Prints alphabetical lists, mailing labels, columnar reports of all or selected records. Calculates between fields. Totals, averages columns. Works with 'Simply Write'. Fast, easy, robust and very, very versatile. Disk £65.

**GOTTA PET? ADDA VIC!** High resolution graphics, programmable characters, colour and sound for your PET/CBM system? All this PLUS a complete extra computer using your PET's disk drives, printer etc? Under £200 including VIC computer and our 'SIMPLY LINK' PET-VIC link system.



**A WINDOW ON YOUR DISK!** Our 'Simply Recover' disk file repair kit (4040 only at present) will allow you to save crashed files, append BASIC or m/c subroutines, change disk names and IDs, devise protection systems, etc. Disk & detailed instructions £17.

**ZYGIAN INVADERS.** Super second generation machine code invaders game.

Tape £6, disk £7.50

**ASTEROID PATROL.** Classic game with sound effects, 9 levels of play, hyperspace jump etc. Tape £6, disk £7.50 ADD VAT TO PRICES PLEASE, BUT ALL INCLUDE P&P. SEND FOR MORE DETAILS, MORE ITEMS, AND GET OUR FREE 'MICROMAIL' PET/VIC NEWSLETTER.

Simple Software Ltd.  
15 Havelock Rd., Brighton,  
Sussex BN1 6GL  
Tel: (0273) 504879

DEALER ENQUIRIES  
J. BLUNDEN - 0438 316561

**MERLIN**  
SOFTWARE

YOUR  
See us on Stand 211 at the COMPUTER Christmas Fair

**CRAZY CAVEMAN** - Journey back to prehistoric times! A tribe of cave dwellers sends out a hunting party, but the men are scattered when they are ambushed by a huge sabre-toothed tiger! You are one of these hunters: separated from your companions and a long way from shelter, you begin the hazardous trek home. On the way there are many dangers, like ROLLING ROCKS, DINOSAURS, DODOS AND PREHISTORIC BIRDS.

**BLUE MOON** - You are the pilot of an intergalactic spacecraft. Your mission is to rescue a sister-ship and her crew who are trapped on a hostile planet and to return with them to the safety of the Blue Moon. However, journeying across the vastness of space there are many hazards to negotiate, such as the deadly BLUE BOUNCERS, COMETS, BELL BIRDS, DROIDS and TECOM ALIENS.

For the **64**

BLUE MOON - You are the pilot of an intergalactic spacecraft. Your mission is to rescue a sister-ship and her crew who are trapped on a hostile planet and to return with them to the safety of the Blue Moon. However, journeying across the vastness of space there are many hazards to negotiate, such as the deadly BLUE BOUNCERS, COMETS, BELL BIRDS, DROIDS and TECOM ALIENS.

Please make cheques payable to: MERLIN SOFTWARE  
Send to: Business & Technology Centre, Bessemer Drive, Stevenage, Herts SG1 2DX

I ENCLOSE CHEQUE/P.O. for £ \_\_\_\_\_

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

TICK REQUIRED TITLE(S).  **BLUE MOON**  **CRAZY CAVEMAN**

CC/12

# Superbase

TRANSFORMS THE COMMODORE 700 OR CBM 8096 INTO A FULL-FEATURED PROFESSIONAL DATABASE SYSTEM! WITH UP TO 1000 CHARACTERS PER RECORD OR UP TO FOUR SCREENS... AND UP TO 128 ITEMS PER RECORD, DEFINABLE AS KEY, TEXT, NUMERIC, CONSTANT, RESULT, OR DATE... IN FILES OF UP TO 16M CHARACTERS! SUPERBASE EVEN HAS A SPREADSHEET AND CALCULATOR CAPABILITY, AND CALENDAR FUNCTIONS, EASY INPUT FROM WORD-PROCESSOR AND DATA FILES, BOTH MENU-DRIVEN AND PROGRAM OPTIONS, SORTING/SEARCHING WITH MULTIPLE CRITERIA, FULLY DEFINABLE REPORT AND SCREEN FORMATS, TRANSACTION HANDLING... SUPERBASE IS ESSENTIAL IF YOU WANT THE MOST FROM YOUR COMMODORE COMPUTER!

● SPECIAL OFFER PRICE £517.50 £425!

# Superscript II

SUPERSCRIPT II IS THE COMPLETE DOCUMENT PREPARATION & STORAGE SYSTEM, MAKING OPTIMUM USE OF MEMORY & DISK SPACE... AND IT'S AVAILABLE NOW FOR THE COMMODORE 700 COMPUTER, WITH A HOST OF NEW FUNCTIONS, INCLUDING CALCULATOR, ARITHMETIC, BUILT-IN SPELLING CHECKER, AS WELL ALL THE OUTSTANDING FEATURES OF THE ORIGINAL SUPERSCRIPT... IN SHORT, IT OFFERS ALL THE ADVANTAGES OF A PROFESSIONAL WORD-PROCESSING SYSTEM, AT A PRICE THAT CANNOT BE IGNORED!

● SPECIAL OFFER PRICE £517.50 £425!

# Master

MASTER 700 IS A TOTALLY NEW CONCEPT... A COMPLETE PROGRAMMING AND SYSTEM DEVELOPMENT PACKAGE, AND IT'S AVAILABLE NOW FOR THE NEW COMMODORE 700 COMPUTER. MASTER ADDS 85 NEW COMMANDS TO CBM BASIC, INCLUDING PROGRAMMER'S TOOLKIT, BUSINESS BASIC, KEYED DISK ACCESS, MULTI-SCREEN MANAGEMENT, USER-DEFINABLE INPUT ZONES, REPORT GENERATOR, 22-PLACE ARITHMETIC, DATE CONTROL, STRING FUNCTIONS, DISK DATA COMPRESSION, SCREEN PLOTTING, SCREEN DUMP, AND MORE... IN FACT EVERYTHING YOU NEED TO PROGRAM THE CBM 700 TO TOP PROFESSIONAL STANDARDS! SUPPLIED AT £339.25, WITH USER REFERENCE MANUAL, QUICK REFERENCE GUIDE AND DEMO PROGRAMS, ALSO AVAILABLE FOR THE CBM 64 (£143.75 £115!) AND CBM 4032/8032/8096 (£339.25 £225!)

THESE ARE JUST SOME OF OUR FINE SOFTWARE PRODUCTS FOR COMMODORE COMPUTERS... PLEASE TELEPHONE OR WRITE FOR FREE DATA SHEETS! PRICES SHOWN INCLUDE 15% VAT AND ARE CORRECT AT TIME OF GOING TO PRESS. ORDER BY POST/TELEPHONE/PRESTEL, USING CHEQUE, ACCESS, BARCLAY CARD OR OFFICIAL ORDER. TELEPHONE 01-546-7256 FOR SAME-DAY DESPATCH! POST FREE EXCEPT ON CREDIT/OVERSEAS ORDERS. (REF A24)

# Calco Software

LAKESIDE HOUSE, KINGSTON HILL, SURREY KT2 7QT TEL 01-546-7256

# VIC PRINTER

**VIC-20 CBM-64**

FOR ONLY £68.95

Probably the world's cheapest VIC/64 Printer! Put a Sinclair ZX Printer (order Printer and Power supply from Sinclair or many High Street stores - R.R.P. £48) on your VIC/64 using the

# SOFTEX PRINTERFACE

Costing only... £19.95 + £1 P&P.

Complete system... £68.95 + £2.95 P&P.

- Very high resolution graphics (higher than VIC/64).
- Full VIC/64 character set + user-defined graphic characters.
- 43 Column Printer with superb formatting facilities.
- Operating commands same as Commodore VIC/64 printer.
- Simple to use! No extras required.

Send orders/enquiries (dealer enquiries welcome) to:

# SOFTEX COMPUTERS

Dept C2, 37 Wheaton Road,  
Bournemouth BH7 6LH.  
Tel: 0202 422028

## PET CONVERSIONS & UPGRADES

It's here at a **NEW** low low price!! Don't throw out your old 9" PET. The **MICROPORT 80** column conversion board for the 9" PET/CBM BASIC 4.0, or upgraded 2001/3000 series machines, will upgrade it to a true 8000 series. Simply plugs into the main logic board and with a small keyboard modification turns your PET into an 8032. Compatible with 8032 software and add-on ROM utilities. Supplied complete with full fitting instructions, or fitted free of charge if brought to our workshops.

Full money back guarantee within 14 days if not delighted. £125.00  
 Externally mounted switching unit for above (40/80 column switchable) £15.00  
 12" VDU (FAT40) 80 column conversion £82.00  
 40 to 80 column switchable (two machines in one!) £98.00  
 Full keyboard functions:- i.e. TAB, ESC, REPEAT, SCROLL up/down, define WINDOW, lower case, graphics mode & DELETE from/to cursor. All available in direct or program mode. Any **MICROPORT** converted machine is also upgradable to 8096 specification with our 64K add-on board. £250.00

### CBM 64 QUALITY SOFTWARE

If you own a PET system with disks or printer and have added a COMMODORE 64 then why not use your PET as an interface for the 64?

**SIPOD** is a serial IEEE to parallel IEEE software interface allowing you to use all the PET's disk drives, printers, plotters, modems etc. directly from the 64. No memory space is consumed within the 64 as **SIPOD** loads and executes within the PET. **SIPOD** is supplied complete with interface lead and instructions. £29.00

**PRINTLINK 64**. Interfaces a 64 directly to any printer with a Centronics input. The printer will respond to all the normal Basic commands for device #4. Supplied complete with instructions and interface cable. £26.00

We only sell one word processor for the 64. We think it is the best!

**VIZAWRITE 64**. Text formatting word processor. Disk or cartridge £69.00  
**VIZASPELL 64**. Spelling checker with 30,000 word dictionary £59.00  
**VIZAWRITE + VIZASPELL**. Combined package. (Disk only) £99.00

**MIKRO ASSEMBLER**. Write machine code with the ease of BASIC £50.00  
**ARROW**. Save & load to tape up to 7 times faster than normal £39.00

**VICTREE**. All Toolkit & BASIC 4.0 commands plus a lot more £49.00

**ZOOM**. An excellent machine code monitor for the 64 £10.00

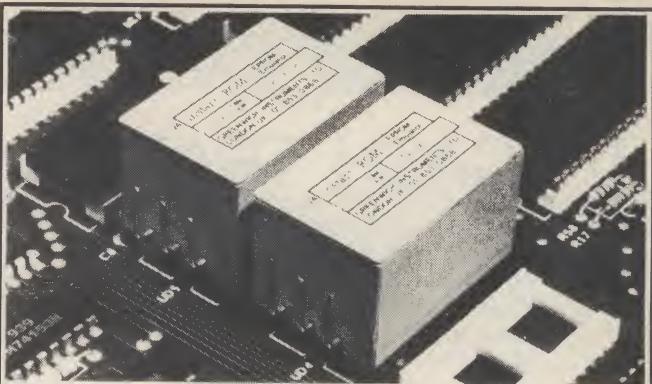
**GRAPHIX 64**. Easy to use Hi-Resolution graphics from BASIC £10.00

**STIX**. A most addictive and compelling game (joystick required) £17.35

Official orders from schools, universities, major companies etc. are welcome.  
 U.K. customers please add 15% VAT. Prepaid orders are POST FREE.

Telephone Mick Bignell for details of any of the above at:-

**MICROPORT** 7 Clydesdale Close, Borehamwood, Herts. WD6 2SD. Tel: 01-953 8385



### INSTANT ROM (Commodore Approved)

Greenwich Instruments' ROM/EPROM Emulators are non-volatile memory modules which plug into any ROM/EPROM socket. When the power is switched off, data is retained for up to 10 years. Emulators from 2 Kbytes to 32Kbytes are available. In the PET, a 4Kbyte Emulator can be fitted in the 9000 or A000 socket, and used for fast program development. Basic or Machine-code programs can be stored, permanently.

GR2532 4Kbyte Emulator..... £56.00  
 Adaptor GA1 (essential for PET users) ..... £ 6.00

### PETCLOCK (Commodore Approved)

PETCLOCK plugs into any Commodore machine with User-Port, and gives time (hour / minute/second) and date (year/month/date/day of week). Battery backup—accuracy is maintained when the power is off.

GCC1 PETCLOCK..... £62.00

### G-ROM E

A 4 Kbyte EPROM which runs, at switch-on, any Basic or Machine-code program stored in INSTANT ROM, eliminating the need for tape or disc. Basic programs can be stored with a few key-strokes.

Some powerful utilities are included for program revival. PET's power-up memory test is made non-destructive, and UN-NEW us provided. A program for reading Date and time from PETCLOCK is also included.

G-ROM E (specify type of PET) ..... £25.00

Postage (£1.00) and VAT are extra. Leaflets are available.

**GREENWICH INSTRUMENTS LIMITED, 22 BARDSLEY LANE,  
 GREENWICH, LONDON SE10 9RF.**  
 Tel: 01-853 0868. Telex 896691 Attn. GIL.

# COMMODORE

COMPUTING INTERNATIONAL

## SUBSCRIPTION ORDER FORM

Please send me 12 issues of *Commodore Computing*

CHEQUE ENCLOSED

PLEASE DEBIT MY ACCESS

AMERICAN EXPRESS

BARCLAYCARD

CHARGE NO.

Expiry date:

Cheques should be made payable to:  
 Commodore Computing

TO AVOID FUTURE LAPSE IN MY SUBSCRIPTION  
 PLEASE DEBIT MY RENEWAL FEE TO MY CREDIT  
 CARD ANNUALLY UNTIL I CANCEL IN WRITING.

Name.....

Address .....

County ..... Post Code .....

Telephone (home).....

(Business) .....

Signed.....

Date (Sub to commence) .....

Subscription rate U.K. £15.00

Europe £20.00

Outside Europe £28.50

Return form to:  
 Subscriptions Manager,  
 Commodore Computing International  
 167-169 Great Portland Street,  
 London, W1

# BOOKKEEPING FOR THE CASH TRADER ON THE **CBM 64**

- \* Purchase day book
- \* Weekly takings summary
- \* VAT Account (Retailer schemes A & B)
- \* Trading Account
- \* Profit & Loss Account
- \* Balance Sheet

PRICE £78.00 + VAT

QUICKCOUNT LTD  
15 NEEDL CRESCENT LONDON NW4  
TEL: 01-202 5486

## COMMODORE 64 NEW, FAST AND POWERFUL ASSEMBLER/DIS-ASSEMBLER

Lets you program using 6510/6502 mnemonics, as easily as if it were Basic. Just enter the line number followed by the statement.

**LABELS** allowed with all branch and jump instructions.  
**VARIABLES** Let you refer to data or memory locations by a name.

**COMMENTS** are allowed anywhere.  
All function keys defined to execute commands  
**(LOAD, SAVE ASSEMBLE, DIS-ASSEMBLE,  
ERASE AND STOP).**

### SIX POWERFUL ASSEMBLER DIRECTIVES (PSEUDO OPS)

**ASCII** – used to enter ascii into memory  
**BASE** – destination of assembled code  
**BIT** – used to enter bit patterns into memory  
**BYTE** – puts bytes of data into memory  
**END** – defines end of source code  
**WORD** – similar to byte, but it enters two bytes for each value given

### FIVE CONTROL COMMANDS

**LOAD** – load your own assembler program from tape or disk  
**SAVE** – save your own assembler program to tape or disk  
**DISPLAY** – displays your assembler program  
**STOP** – stop current operation  
**ERASE** – erase your assembler program (not the assembler)

### DIS-ASSEMBLER

You enter start and finish address, and that section of memory will be dis-assembled in full 6510/6502 mnemonics. Use dis-assembler to examine any of the 450 routines that make up the Basic Interpreter and Operating system.

### BOOKS

A manual containing details, descriptions and addresses of all the Basic Interpreters and Operating systems 450 routines (on 16K ROM) is available for £4.99.

**SAE for details**  
**MICRO POWER**  
BCM 8713 LONDON  
WC1N 3XX

**ASSEMBLER/DIS-  
ASSEMBLER tape,  
plus manual £9.99  
overseas £15.99**

# C.C.I SOFTWARE

## SUBSCRIPTION

*Are you tired of keying in all the programmes in this magazine?*

Keying in lengthy programmes can be extremely tedious, and you can also end up spending a lot of time weeding out syntax errors. We know the programmes are popular from the volume of enquiries we get. So we have decided to make available to you all our programmes on tape.

For £15 per year we will send you 1 cassette every 1/4 containing all the programmes listed in the previous 3 issues relating to your type of machine.

If you are already a subscriber to C.C.I. magazine we are making the offer at a reduced rate of £10 P.A. If you are not already a subscriber, you can still take advantage of this offer by starting a subscription to the magazine at the same time. (See page 96 for details.)

The first tape, containing programmes from the **June, July** and **August** issues is available now, so fill in the coupon and send your cheque/postal order etc to us and we will despatch your cassette within **28** days.

Please send me four quarterly cassettes of the program listings in Commodore Computing suitable for my  VIC20,  64,  PET.

I enclose a cheque for

£15 UK

£20 Europe

£28.50 Outside Europe

Please debit my

VISA/AMEX/ACCESS card

number

Name .....

Address .....

Telephone (home) .....

Telephone (business) .....

Signed .....

Date .....

Return form to Subscriptions Manager, Commodore Computing International, 167 - 169 Great Portland Street, London W1.

# CHRISTMAS GIFTS



## SPECTRESOFT

MISSION OM challenges the player to find a way through hazards, fight enemies, avoid hidden traps and sudden dangers in the aim to find the password which will allow the recovery of the symbolic crown of Om. Cryptic clues which could help to use the special powers that need to be discovered. Comes on cassette for the CBM 64 and uses a keyboard. £7.95.

## ABRASCO

VIXPLODE-64 is a board game in which a player must gain possession of all the squares. A VIXIPLOSION occurs if the number of counters equals the number of the adjacent sides. There are 6 levels of difficulty. Comes on cassette for the CBM 64 and can be played with a keyboard or a joystick. £8.50. (Also available for the Vic 20). FLY SNATCHER is set in a field with bushes and flies where the only way to survive is to snatch flies and hide in a bush. Also in residence is a hungry weasel which tries to eat the player. Gets progressively faster. Available on cassette for the unexpanded Vic 20 and used with either a joystick or keyboard. £7.50.

METER MANIA – the player is chased by four meter maids and has to pick up enough coins to feed the meter before the time runs out. Supplied on cassette for the unexpanded Vic 20 and can be played with a joystick or keyboard. £7.50.

DOUBLE TROUBLE is a game for one or two players can play against the Vic and deflect balls into fruit like objects which appear despite Schizophrenic Spike. Growing walls and court boundaries add to the difficulties. Comes on cassette for the unexpanded Vic 20 and needs a keyboard. £9.50.

ALIEN HUNTER – the player must destroy the drones the alien has left behind, as he moves around the screen. Asteroids must be avoided and fuel starts to run out as the game starts getting faster. £7.50.

CATCHA TROOPER is a game in which parachutists are falling from the top of the screen and they must be caught before they fall into a shark infested sea. The player controls a boat and can use a rope ladder for rescuing. Available on cassette for the unexpanded Vic 20 and played with a keyboard or joystick. £9.50

ANDROIDS ATTACK – a city is being attacked by androids and must be defended. If an android lands, a giant cruiser releases an indestructible warhead. Comes on cassette for the unexpanded Vic 20 and played with a joystick or keyboard. £9.50.

## TERMINAL SOFTWARE

SUPER SKRAMBLE – the player has to pilot a ship over mountainous terrain bombing the enemy ships and bases. Sectors such as the cave and meteor storm must be mastered in the goal to destroy the main enemy base. For the CBM 64 in cassette form and played with joystick or keyboard. £9.95.

SUPER GRIDDER is a fight against time to retrace the lines of a luminous grid in the black void of space. Tactics neces-

sary to elude various carnivorous scorpions that pursue the player through series of eight grid. Three lives per game. Come on cassette for the CBM 64 and played with a joystick or keyboard. £9.95.

PINBALL WIZARD is similar to the Arcade game, the plunger releases the ball and the bumpers, rollovers, slingshots and 3 flippers are all there to help the scoring. 5 balls per game and suitable for one or two players. For the unexpanded Vic 20, comes in cassette form and is played with the keyboard. £7.95.

TERMINAL INVADERS is a game of aerial bombardment. The destruction of enemy ships, evasive tactics, and clever use of the defense shields all help postpone eventual defeat with the Bug-eyed monster. For the unexpanded Vic 20, comes in cassette form and is played with keyboard. £5.95.

METEOR BLASTER – The player must control the space ship using the gunsight and steer a way through meteor storms, blasting the meteors with a laser. Space demons, UFO's etc keep attacking the ship, draining it of energy, but tankers are there to help. Played on unexpanded Vic 20, comes in cassette form and can be played with a joystick or keyboard. £5.95.

GRIDDER – all the squares in a grid must be coloured in before moving into the next one. An evil being follows the painter and he must use tactics to evade being touched. There are 256 mazes and the number of chasers increases. Played on the Vic 20, comes in cassette form and can be played with a joystick or a keyboard. £7.95.

SKRAMBLE – the space fighter must be piloted through eight different sections, for instance rough terrain, caves and skyscrapers. Each has its own forms of aliens and obstacles. Played on the unexpanded Vic 20, comes in cassette form and can be played with a joystick or a keyboard. £7.95.

MAGIC MIRROR is an adventure game for the Vic 20 (8 or 16k). The aim is to retrieve the magic mirror from somewhere in the programmers landscape. Follows standard adventure format. Split screen display, with the location details at top and conversation at bottom. Supplied on cassette and played with a keyboard. £9.95.

THE CURSE OF THE WEREWOLF is slightly different to standard adventure games. It involves solving problems, collecting and manipulating items and finding clues. Monsters stalk the 70 locations occasionally presenting a challenge. For the Vic 20 (16k), it is supplied on cassette form and uses a keyboard. £9.95.

RESCUE FROM CASTLE DREAD is a typical adventure format. The computer informs the player of location and the surroundings. The adventurer has to find way through



SUPER DOGFIGHT displays an aerial view of an imaginary duel between two World War I aces. Clear sky and dense white cloud provide the setting as two players fly their biplanes into combat. Comes on cassette for the CBM 65 and can be played with two joysticks or joystick and keyboard. £9.95.

# CHRISTMAS GIFTS

scenario with 70 locations solving problems and collecting items to help him. For the Vic 20 (16k), supplied on cassette and uses a keyboard. £9.95.

LINE UP 4 and REVERSI are two educational board-type games on one tape. Line Up 4 features a 7x7 matrix in which the player and computer take turns to drop counters. The aim is to form a line of 4 counters in any direction. Reversi is the computerised Othello in which the player competes against the computer. Involves a lot of thought. Available on cassette for the unexpanded Vic 20 and uses a keyboard. £7.95.

GET LOST is a maze game in which there are six different levels of complication to play on. The aim is to get through the maze in as few moves as possible and on the easiest level, a plan and 3-D view of maze and direction helpers are there to help. Available on cassette for the unexpanded Vic 20 and uses a keyboard. £5.95.

## C.P. WHITE SERVICES

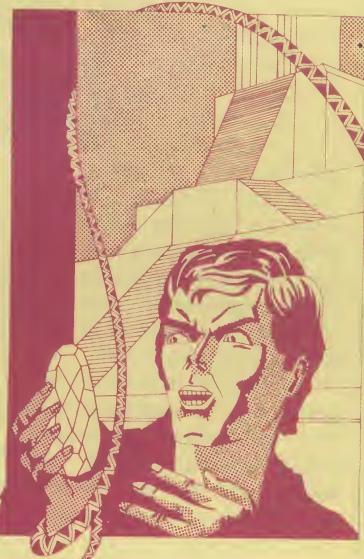
PONTOON is a computerised version of the card game. Can be played with two players or with one player against the computer. Available on cassette for the CBM 64 and played with a keyboard. £3.50.

HAUNTED CASTLE is set in a haunted castle! The player wanders through several rooms and in each room there are objects which can be picked up or left. Intended to be a brain teaser. Supplied on cassette for the CBM 64 and played with a keyboard. £3.50.

## MICROS

VULTURES – vultures and eggs fly out of the sky and the player has to destroy them before they carry him off. The eggs provide added danger. Features include scores and high scores and bonus lives. Available in cassette form for the CBM 64 and used with a joystick. £6.95.

## IMAGINATION UNLIMITED



SNAKE PIT is staged in a snake pit, the gobbler must eat all the snakes and their eggs. As the eggs are eaten more snakes are freed and once all the snakes have been eaten the game begins again. Supplied on cassette for the CBM 64 and played with keyboard or joystick. £7.99.

SHADOWFAX is Gandalf's horse in Lord of the Rings and he must be guided through an attack from the riders of Sauron. Thunder bolts are used to protect Shadowfax from the agents of Lord Modor. For the CBM 64, supplied on cassette and played with a keyboard or joystick. £6.95.

SIEGE challenges you to defend a castle surrounded by marauders. Dropping rocks dislodges them, but makes the onslaught faster and holding them back becomes more difficult. For the CBM 64, supplied on cassette and can be played with a keyboard or joystick. £7.99.

## CHALKSOFT

Chalksoft specialise in producing educational tapes suitable for a Vic 20 with any expansion RAM pack fitted. They can all be used at home or at school.

NOTE INVADERS is made up of three programs to help children learn to read music. STAFF 1 and STAFF 2 teach all the notes. INVADERS is a version of the game where musical notes attack the players base, failure to recognise them result in catastrophe. Supplied on cassette for the Vic 20 (any RAM expansion) and played with a keyboard.

DECIMALS is for children aged 9 and over, this program helps them to learn decimals. Firstly an interactive test assesses them and then sets a lot of practice with the sums found difficult. Includes subtraction, multiplication, and division. Comes on cassette for the expanded Vic 20 and is played with a keyboard. £9.25.

INKOSI is an African King who must rule his kingdom for ten years, involving the planning of stocks and stores of maize, cows and other supplies. The Witchdoctor and raiding UMO tribe present problems and basic mathematical skills are needed. Available on cassette for the expanded Vic 20 and played with a keyboard. £6.95.

INVISIBLE MAN draws and labels a Cartesian grid and then hides a large cartoon. Shots have to be taken and compass point clues are given e.g. GO and SOUTH to help find him. Three levels of difficulty and suitable for ages 4-17 years. Supplied on cassette for the expanded Vic 20 and used with a keyboard. £6.95.

## RABBIT SOFTWARE

PAKACUDA is set in the Caribbean sea, the barracuda must swim around and eat as many fish and electric eels as possible while fighting off attacks from ravenous octopuses. Supplied on cassette for the CBM 64 and played with a joystick. £5.99.

CENTROPODS maroons you on a hostile planet with only a blaster as a weapon. The player must withstand waves of centrons and avoid spinning buzzers, falling missiles and stick glue pods. Comes on

cassette for the CBM 64 and requires a joystick. £5.99.

ESCAPE-MCP – the computer has gone mad and the player de-atomized. The only escape is to get through 9 levels of logic evading the MCP which knows of the escape plans. Available on cassette for the CBM 64 and needs a joystick. £5.99.

CYCLONS makes you the commander of the defending forces of Sol who must destroy the invading Warships of the Cytron empire. First the Cyclon fighters appear and then the Pulsar Death Ship. Comes on cassette for the CBM 64 and requires a joystick. £5.99.

ANNIHILATOR takes you to a distant planetoid whose rocky terrain is home for humanoids. They must be defended from hovering Landers. Baters, Bombers, Pods and Swamers present added difficulties. Available on cassette for the CBM 64 and played with a joystick. £5.99.



MONOPOLE is based on the famous board game with a similar name! The player must go around London buying properties and developing them. High rents must be charged to try and bankrupt the opponent but overtrading is a danger. Available on cassette for the CBM 64 and needs a keyboard. £5.99.

# CHRISTMAS GIFTS

## ROMIK

ZAPPY ZOOKS is a game in which a whirly has to be guided through space corridors avoiding Zooks and collecting alpha particles. The Zooks become weak and easily caught if their power plug is removed. Supplied on cassette for the CBM 64 and needs a joystick.

DICKY'S DIAMONDS – Dicky the Owl has to retrieve diamonds stolen by Stephen the Spider by weakening his webs until they fall. There are 70 different starting levels. Available on cassette for the CBM 64 can be played with a joystick or keyboard.

FOOL'S GOLD is a classic adventure game. Treasure is hidden somewhere in the maze of tunnels of an old mining works and there are over 150 rooms to enter. Wild beasts make the search hazardous. Supplied on cassette for the CBM 64 and played with a keyboard.

TOMBS OF XEIOPS is set in the Egyptian desert, treasure is hidden within some tombs. Deadly cobras make the task of retrieving this treasure difficult and there are over 100 rooms to explore. Available for the CBM 64 on cassette and is played with a keyboard.

## INTERCEPTOR

FROGGER 64 is written in machine code for the CBM 64, the aim of the game is to get give defenceless frogs across a busy road and a hazardous river. Each screen change brings different dangers and it contains a Hall of Fame feature. Comes on cassette for the CBM 64 and a keyboard or joystick can be used. £7.00.

SCRAMBLE 64 – The caverns honeycombing the alien planet must be penetrated, but the defending forces are ready and prevent any vital energy coming from the mothership. To counteract this, the player must destroy the enemy deflection disks and receive energy. Comes on cassette for the CBM 64 and controlled with a joystick or keyboard. £7.00.

CRAZY KONG has captured a girl and taken her to the top of his steel fortress. The aim is to rescue her, but several screens must be negotiated before kong can be destroyed. All the diamonds must be collected on the way up. Available on cassette for the CBM 64 and can be played with either a joystick or keyboard. £7.00.

PANIC 64 – the aim is to trick the monsters to fall into holes created by bombs while they are chasing the player. Flying shrapnel has to be avoided and the game gets progressively more difficult. Three lives per game. Comes on cassette for the CBM 64 and can be played with a joystick or a keyboard. £7.00.

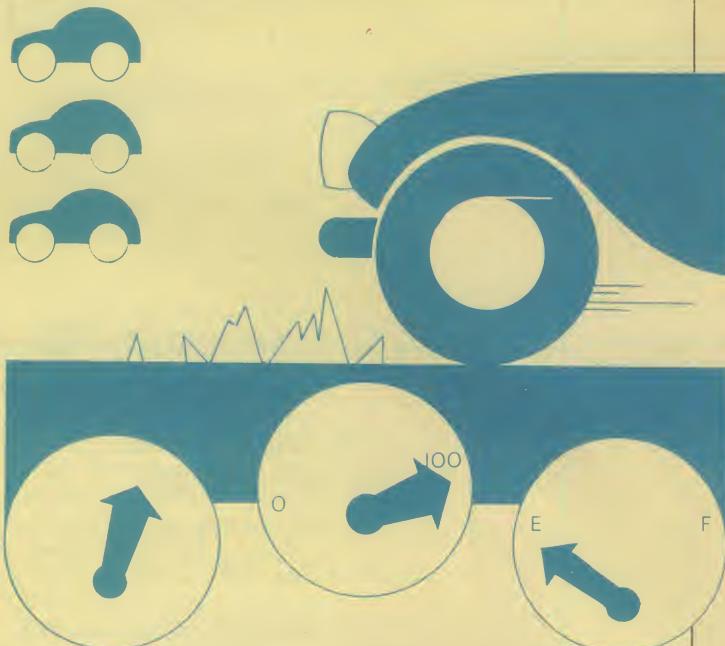
SPRITE MAN – four hungry ghosts pursue the player while trying to clear the maze of dots. Around the maze pills, fruits and other objects lie around giving anyone who eats them extra power. Supplied on cassette for the CBM 64 and played with a joystick or keyboard. £7.00.

## AUDIOGENIC

ROAD TOAD – the toads in the mating season have to get to their breeding grounds and risk death from the road and river. The player must escort the toads and negotiate all the hazards – cars, snakes, crocodiles. Comes on cassette for the CBM 64 and needs a joystick. £8.95.

RENAISSANCE is a CBM 64 version of the board game Othello. It incorporates similar functions of the game, including features such as 9 levels of play and changing the level and sides. Controlled with a joystick and supplied on cassette for the CBM 64. £8.95.

WORD FEUD – A 'word find' game for one or more players. The aim is to find the right word hidden amongst a jumble of words on the screen. It is partly educational and suitable for all ages. Comes on cassette for the CBM 64 and can be played with a joystick or keyboard. £8.95.



MOTORING MANIA is a car race across the country. The aim is to drive the car very fast round the track avoiding obstacles, hazards and other traffic. There are 5 cars allotted to each game and a dashboard display and sprite graphics are there to help. Available on cassette for the CBM 64 and requires a joystick.

Audiogenic also manufacture and distribute Supersoft and Kavan software.

KAKTUS – A Gopher must protect the lone giant cactus from the attacking wasps and hornets. Acid droppings, moles, buzzards and their eggs try to impede any progress. Comes on cassette for the Vic 20 (8K) and can be played with a joystick or keyboard. £7.95.

MANGROVE – deep in the mangrove swamps a culture of life saving cells have been attacked by deadly germ microbes. The player must mastermind the regeneration of the cell culture. Smart pills can help in difficult moments. Supplied on cassette for the unexpanded Vic 20 and can be played with a joystick or keyboard. £7.95.

A COUNTRY GARDEN is infested by mutant pests – Caterpillars, fleas, snails and even mushrooms. Aggressive armoured moles are introduced to the garden and the player must guide them as they are blind. 4 moles can be used to destroy as many vermin as possible. Comes on

cassette for the Vic 20 (8K) and played with a keyboard or joystick. £7.95.

BONZO – the player assumes the role of a workman who starts at the bottom of the screen and has to clear all the boxes from different levels by walking along and climbing up ladders. Bonzo guards these boxes! Four men for each game. Available on cassette for the Vic 20 (8K) and played with the keyboard. £7.95.

PIT Hans the handyman has to cross the screen collect a bag of gold and return with it while avoiding acid snowflakes. Blocks provide some shelter. Three lives available for each game. Comes on cassette for the unexpanded Vic 20 and can be played with keyboard or joystick. £7.95.

GRANDMASTER is a computerised chess game. It is possible to play in a variety of colours using the square board. Facilities include a function to force the grandmaster to make the move it is considering. Comes on cassette for the CBM 64 and Vic 20 and played with a keyboard. £17.95.

# CHRISTMAS GIFTS

## QUICKSILVA



**RING OF POWER** – the Colourful King has been driven from his kingdom and with him went the secret of the location of the Crown Jewels. An adventure game where the player must find the jewels and become King. Can be played with graphics or text. Available on cassette for the CBM 64 and used with a keyboard. £9.95.

**AQUAPLANE** – Aim is to water ski in an aquaplane avoiding and negotiating obstacles such as rocks, logs and the great white hungry. Played with a joystick and comes in cassette for the CBM 64. £7.95.

**PURPLE TURTLE** is a game which involves stepping over purple turtles carrying items backwards and forwards across a river. Graphics and colour abound in the program. Available on cassette form for the CBM 64 and played with a joystick. £7.95.

**QUINTIC WARRIOR** is a game involving the extraordinary Quintic Warrior and his stand against sinister Crabmen and various mangled mutants. Using his sixth sense and a Blaster the player must protect the domed city. Comes on cassette for the CBM 64 and used with a joystick. £7.95.

## COMMODORE

**QUIZMASTER** is a program which enables the user to create, edit and run 40 question quizzes. It can be used for fun as a revision and teaching aid for children. Comes on cassette for the CBM 64. £9.99.

**BBC MASTERMIND** is a version of the contest on television. There are questions and answers for general and specialist subjects. Can be played by one to four contestants. Additional General Knowledge programs and four specialist programs; Wine and Food, Music, Sport and Games and Films and TV. Supplied on cassette for the CBM 64. £9.99.

**MATCHMAKER** is a game which enables everyone to get to know each other! Each person has to answer 25 personal questions and later the results have to be read out. Comes on cassette for the CBM 64 and the Vic 20. £9.99.

**ASK THE FAMILY** is based on the TV game it has written, musical and graphical general knowledge questions. Two groups of people can play and each side presses the buzzer to answer a question. Comes on cassette for the Vic 20. £9.99.

**FACE ACHE** presents a face of strange characteristics and the aim is to reconstruct this face. Available on cassette for the CBM 64 and played with a keyboard. £4.99.

**SPIRATES AND SNOWMEN** are two educational games for the 5-11 year olds. In Spirates the player is manning the guns of one of two ships locked in combat. Answering multiplication questions correctly increases the chances. In Snowmen, two players are racing to build snowmen. Correct answers to multiplication and addition questions increases your chances. Several levels of difficulty. Comes on cassette for the CBM 64. £4.99.

**DEPTH CHARGE** promotes the player to the position of commander of a frigate and must prevent enemy submarines from entering a secret

naval base. Mines must be avoided. Available on cassette for the CBM 64. £4.99.

**LABYRINTH** is a simple maze game. The size of the maze and its degree of difficulty can be changed. The aim is to find the way out. Comes on cassette for the CBM 64. £4.99.

**SOOPER FROOTER** incorporates all the features of the fruit machine with hold, nudge and random respin. The player starts with two pounds. Supplied on cassette for the CBM 64. £4.99.

**MAGGOT MANIA** involves a creature with a venomous sting which has three lives. He must kill the maggots before he is eaten alive. Spiders and snails must also be destroyed. Comes on cassette for the CBM 64 or Vic 20 and needs a light pen.

**SHUFFLER** – the player is presented with a grid of shuffled letters and they must be arranged alphabetically, moving one letter at a time into a vacant square. Comes on cassette for the CBM 64 and the Vic 20 and needs a light pen.

**LIFE** – the player must form the membranes of cells into a shape by adding or deleting with the lightpen. Once satisfied with the shape and GO is pressed the colony expands and contracts depending on the cell conditions. Comes on cassette for the CBM 64 and Vic 20. £5.75.

**STELLAR WARS** involves a planet which is under attack from aliens and the player must defend using two laser neutron guns. Comes on cassette for the CBM 64 and needs a joystick. £4.99.

**EMMET ATTACK** – The emmets are approaching as the player sits in a bunker on an alien planet. They must be located and destroyed before they reach the bunker. Comes on cassette for the unexpanded Vic 20 and played with a joystick or keyboard. £4.99.

**SPECTRE** traps you inside a haunted mansion filled with treasure, the player must escape by finding and collecting the treasure. Monsters, trap doors, and bottomless wells provide added dangers. Comes on cassette for the Vic 20 (16k) and needs a keyboard. £4.99.

**PATIENCE** is a computerised version of the card game. A shuffled pack of cards must be sorted into suits and at the end of the game must be in

ascending order. Contains graphics. Supplied on cassette for the Vic 20 (16k) and uses a keyboard. £4.99.

## STACK

**TWISTER** is based on a crossword puzzle the player is competing against the computer. Assemble words from the letters that the computer provides. Four letters can be stored and those that cannot be used can be discarded. Comes on cassette for the CBM 64 or Vic 20 and needs a light pen.

**LOST IN THE LABYRINTH** – the player is lost in the labyrinth and danger abounds. The light pen is needed to escape to safety. Supplied on cassette for the 64 and Vic 20. £5.75.

**SIMON** is a version of the well known 'Simon' game. Four coloured blocks are displayed flashing in sequence and must be copied with the light pen. The sequence increases in length and speed. Three chances per game. Comes on cassette for the CBM 64 and the Vic 20. £5.75.

**OTHELLO** is similar to the original board game. The player must attempt to trap the opponents piece in vertical, diagonal and horizontal directions. The aim is to gain as many pieces as possible. Comes on cassette for the CBM 64 and the Vic 20. £5.75.

# QUALITY MATCHED WITH THE BEST PRICE/PERFORMANCE AVAILABLE ESW 3000 DAISYWHEEL PRINTER



OFFICIAL UK DISTRIBUTOR  
Intelligent Interfaces Ltd  
43B Wood Street  
Stratford upon Avon  
Warwickshire  
0789 296879

- \*INTERFACES RS232, CENTRONICS, IEEE
- \*PITCH 10, 12, 15 PS
- \*BUFFER 4K
- \*SPEED 50 CPS
- \*PRINT DAISYWHEEL, 100 CHAR.
- BI-DIRECTIONAL-LOGIC SEEKING
- \*QUME/DIABLO COMP. OPTION.

PRICE £1136  
SHEET FEED £398!

TRACTOR FEED £150

ON-SITE MAINTENANCE  
INCLUDED IN PRICE

LONDON AREA  
ACADEMY MICRO SERVICES  
11 PRIORY GROVE  
LONDON SW8  
01-720 4025

## FROM CAMERA TO COMPUTER

**The ORTHOLOG MODEL 383 TV Interface** is the fastest on the market: it collects images in one frame time (1/25 second), thereby letting you examine either static or moving scenes. It contains a 128-by-128 pixel, 6-bit data store: a comprehensive software package is provided which contains routines for displaying black-and-white images or images with 5 or 10 grey levels, data transfer to and from disk is available and images with 64 grey levels can be recorded photographically. Separate programs are available for object counting, area and perimeter measurement, contouring and velocity or displacement sensing. The Model 383 costs only £850 all-inclusive and the measurement programs are £100 each: demonstrations can be arranged. For more information contact:



Ortholog Ltd., PO Box 72, Edgware, Middlesex HA8 6RD. Tel: 01-952 2459

# ... and if you still can't find anything ...

## Adaptors

An IEE Bus-adaptor allows the user to use standard CBM/PET IEEE disk drives and printers with the VIC and 64. Batch file loading and mini DOS support as well as multi-user bus sharing and simultaneous use of the serial bus. £59 plus VAT. Available from JCL Software, 47 London Road, Southborough, Tunbridge Wells, Kent. Telephone 0892 27454.

## Power Monitor Unit

Fluctuations in the power supply can damage equipment and destroy data. Sentry is a portable monitor unit that will monitor any 240V power supply and indicates fluctuations but does not prevent them. The cost of this is £45 and it comes from Mektronic Consultants, Linden House, 116 Rectory Lane, Prestwich, Manchester M25 5DB. Telephone 061 798 0803

Another voltage monitor unit is called Mainstay which filters and regulates the voltage going into the computer. This costs £49.95 plus VAT and p&p and is from Gould Power Conversion Division, Rhosymedre, Wrexham, Clwyd LL14 3YR Wales. Telephone 0978 821000.

## Dust Covers

Protect your computer equipment with a soft PVC cover that is strongly made and water repellent. Covers for most Commodore equipment, but they can be made to suit customer requirements. Prices start at £1.95. They are available from Sherborne Designs, Victory House, 8A The Rank, North Bradley, Trowbridge, Wiltshire BA14 9RP. Telephone 02214 4425.

## Languages

Forth for the 64 and VIC. This language allows interaction, structured program development and will work in any number base. A text editor and macro assembler are included with the 64 version. The cost for both machines is £33. The Personal Assembly Language for the 64 (PAL 64) is a machine language assembler/monitor that takes up just 4K bytes and costs £69. Both of these can be obtained from Kobra Marketing, PO Box 28, Henley-on-Thames, Oxon RG9 1PF. Telephone 04912 2512.

## Printer Buffers

The PET IEEE printer buffer receives all data in seconds and carries out printing whilst other data is being input. The buffer is 14K and IEEE to Centronics, IEEE or RS232 is possible. This is available from Computer Interface Design, 4 Albert Road, West Brook, Margate, Kent. Telephone: 0843 294648.

## Printer Stand

The new desk top mini printer stand can accommodate most 80 column printers including the MX80. The stand has an easily detachable form tray. The dimensions of the stand are 15 inches x 12.5 inches x 10 inches. The cost of the stand is £22 and it is available from Action Computer Supplies, 6 Abercorn Trading Estate, Manor Farm Road, Alperton, Wembley, Middlesex HA0 1WL. Telephone: 01-930 3921.

## Learning to type

A piece of software called Touch 'n Go is designed to enable the user to master the QWERTY designed keyboard and the numeric keypad. This course should have the user typing at a speed of 40 words per minute. At a cost of £25 plus VAT it is available from Caxton Software Limited, 10/14 Bedford Street, Covent Garden, London WC2E 9HE.

## Screens

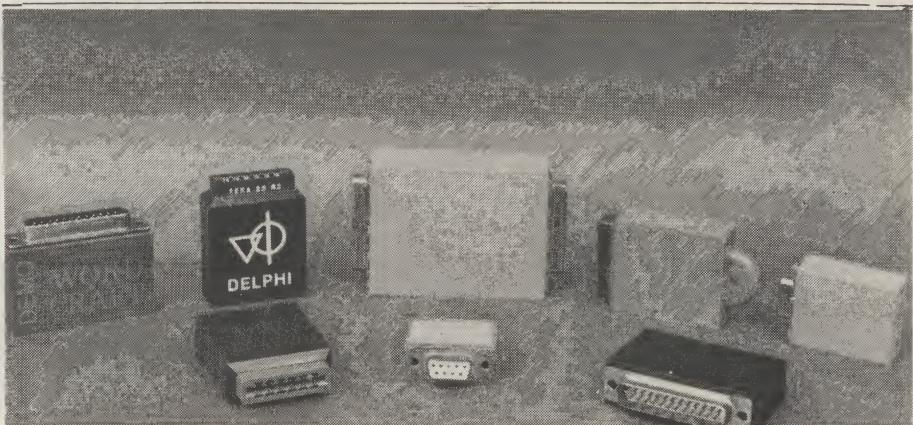
The VDU View Thru antiglare screen is for the 40 and 80 column PET. The screen for the 40 column costs £17.95 whilst the screen for the 80 column cost £19.95 plus VAT. From DAMS Business Computers Limited, Gores Road, Kirkby Industrial Estate, Kirkby, Liverpool L33 7UA. Telephone 051 548 7111.

## Motherboards

The Superboard for the 40 and 80 column PET allows a selection of eight ROM/EPROM, RAM/ROMS from program control and will accept any combination of 2K or 4k ROM/EPROMS, RAM/ROMS. No wires, switches or soldering is required to install the board which costs £52.50. It is manufactured by Computer Interface Designs, 4 Albert Road, West Brook, Margate, Kent. Telephone 0843 294648.

## Home Applications

REL is a control relay system for the VIC and 64 that plugs straight into the user port. It has six relay outputs and two inputs. The cost is £30 and it is available from Kobra Micro Marketing, PO Box 28, Henley-on-Thames, Oxon RG9 1PF. Telephone 04912 2512.



Wordcraft dongles for Wordcraft software on Commodore machines.

## Dongles

Software protection devices for the range of Commodore machines are available from Wordcraft Systems for use with Wordcraft software. Each dongle contains

a unique coding without which the software will not function. For CBM 4000, 8000, 700, VIC 20 and 64. From a starting price of £2.50, these are available from Wordcraft Systems, 43 Farley Road, Derby DE3 6BW. Telephone 0332 683892

# CHRISTMAS GIFTS

## MIKRO 64

A fast 6510/6502 assembler for the CBM 64. Mikro simplifies programming in machine language. It enables source files on disk or tape to be linked to create machine code programs of up to 12K in length. These files can be saved, loaded, verified and edited just like basic programs with AUTO, DELETE and FIND commands to help. Also includes a machine code monitor and a disassembler. Costs £50.00+vat from Supersoft, Winchester House, Canning Road, Wealdstone, Harrow HA3 7SJ. Tel: 01-861 1166.

## Programming Aids

Power 64 is a series of programming tools in the same style as Power for the 4000 and 8000 machines. The cost of Power 64 is £69 and it comes from Kobra Micro Marketing, PO Box 28, Henley-on-Thames, Oxon RG9 1PF telephone 04912 2512.

Merge is a product that allows the user to combine a separate routine and a program, simply by loading the Merge program. The cost is £7.95 and it is for PETs using 4040 disks. From Leader Systems, 85 High Street, Hampton-in-Arden, Solihull, West Midlands B92 0AE telephone 021 236 9768.

## Expansion

Several switchable RAM packs and motherboards to extend the capabilities of the VIC. The 16K costs £34.50, 32K (which is also switchable to 3K, 16K and 24K) costs £55.20. The 4-slot motherboard is priced at £18.40. These are available from Alphascan Limited, Little Bourton House, Southam Road, Banbury, Oxon OX16 7SR. Telephone 029 575 8202.

The SRC 16K memory cartridge for the VIC 20 which can be upgraded to 32K. Games and utilities can be used in the X-ROM socket. The SCR16 can also have an expansion slot built in. Cost £27 from Solidisk Technology Limited, 87 Bournemouth Park Road, Southend-on-Sea, Essex SS2 5JJ. Telephone 0702 613081.

## RAM Packs

The Flexirom 4 costs £33 and consists of a 4K CMOS RAM with battery back-up. Flexirom 8 is a new product providing the user with 8K CMOS RAM and battery back-up for £44. The Superflex Pager is another new product for £59. This consists of four EPROM sockets and two flexiroms.

All of these are for the PET and come from Clever Computer Controls, Clay Court, Lower Hardres, Canterbury, Kent CT4 5PG. Telephone 022770 644.

Increase the VIC 20 to 19967 bytes with the 16K RAM pack which is switch

## Programmers Aids

VICAD is a combination of a programmers toolkit and a Machine Code monitor. The toolkit gives nine extra commands including Auto, Help, Change, Step and Break. The Machine Code monitor gives Save, Memory display, Load and Verify. The cost is £19.95 plus VAT. VICOM is a Machine Code package which comes with assembler and disassembler. This is also priced at £19.95 plus VAT. Both products are from DAMS Business Computers Limited, Gores Road, Kirkby Industrial Estate, Kirkby, Liverpool L33 7UA telephone 051 548 7111.

## Simons Basic

A cartridge enabling the CBM 64 to make programs more efficient and fast with aids such as AUTO, RENUMBER, KEY and TRACE. The COLOUR, HI-RES, CIRCLE, PAINT and PLOT commands can be used to facilitate the use of graphics. Complementing these, are commands for creating sprites and user-defined graphics. It also contains structured programming commands so that within the programs, routines can be construed which can be labelled and called by name. 50.00. By Commodore tel: 0753 79292.

selectable to 3K, 8K and 16K. This will cost £44.50. There is also the Tandem Expandable Expansion System which plugs directly into the back of the VIC. There is a ROM socket for more expansion and expansion slots for VIC 20 cartridges. This cost £34.95 and both products are available from Afdec Electronics Limited, 318 Kempshott Lane, Basingstoke, Hants, RG22 5LT.

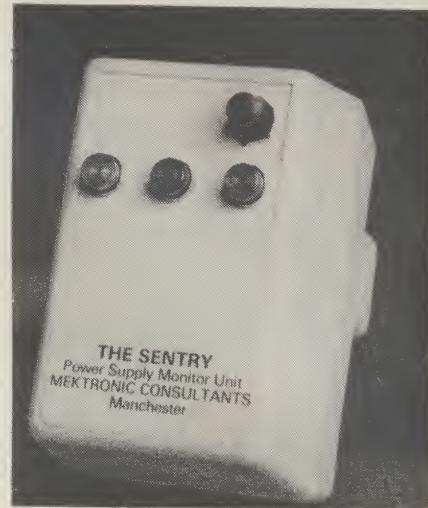
## RAM Packs

For the VIC 20 there is a 16K RAM pack which costs £28.95. This price includes VAT and p&p and the memory expansion cartridge comes from Startech, 208 Aigburth Road, Aigburth, Liverpool L17. Telephone 051 727 7267.

The Vixen RAM cartridge gives the user the option of full 16K RAM or 8K and 3K RAM in one package. This plugs into the rear expansion port of the computer. No re-addressing of existing BASIC programs is required. The cost is £44.95 and comes from Stonechip Electronics, Unit 9, The Brook Industrial Estate, Deadbrook Lane, Aldershot, Hants. Telephone 0252 318260.

## Light Pen

An accurate colour light pen, this device can be pointed at the screen and tells the Vic 20 or the CBM 64 what it sees. Used instead of pressing keys the light pen can



## Security

Securing programs on the 8000 series machines can be done using Safeware which must be used in conjunction with the Pet-Speed compiler. Each unit has a unique code and no two Safeware packages are the same. The cost of this package is £24 plus VAT and is available from Mektronic Consultants, Linden House, 116 Rectory Lane, Prestwich, Manchester M25 5DB. Telephone 061 798 0803.



be used to play a range of games produced by the same company. It can also write programs which allow the user to read what is on the TV screen or place images and words on the screen. £28.75. From Stack Computer Services Ltd, 290-298 Derby Road, Bootle, Liverpool.

## Lightpen

The Datapen light pen is compatible with the VIC 20 and costs £25. The pen has an LED readout indicating that data is ready and a switch that allows the operator to signal when the position is right. From Datapen Microtechnology Limited, Kingsclere Road, Overton, Hants. RG25 3JB. Telephone: 0256 770488.

# CHRISTMAS GIFTS

## ANTISTATIC WIPES AND SPRAYS

Wipes and sprays can be used to eliminate static electricity and reduce the effect of dust on the screen and operator fatigue. Spray per bottle: £4.40 and 50 wipes per pack: £7.60. From Cambra and available from Vicsoft. Telephone: 0753 73638.

## Head Cleaning Diskettes

A cleaning kit containing two diskettes and a bottle of fluid is enough for 30 cleaning operations. These 3M cleaning diskettes remove contamination from the read/write heads. Suitable for single or double sided drives. For 5 1/4 inch: £21.00 and 8 inch: £23.00. Available from Stralfors Data Products, Unit 11, Techno Trading Estate, Bramble Road, Swindon. Telephone: 0793 37837.

## Cassette Head Cleaner

A non-abrasive tape head cleaner which helps to keep the cassette unit clean. It can be loaded into the cassette unit and played. 99p. Made by Cambra and available from Vicsoft. Telephone: 0753 73638.

## Extension Lead

A 12 foot long extension lead which can be attached to a joystick to lengthen it and give the player more freedom. £7.95. From Silica Shop Ltd, Dept ZPCW 0883, 1-4 The Mews, Hatherley Road, Sidcup, Kent. Tel: 01-309 1111.

## Furniture

An expansion console which gives the VIC the professional look and protects the micro and disc drives. All wiring is hidden out of sight and the console cost £39.99 from Silent Computers, 27 Wycombe Road, London N17 9XN

A series of workstations give enough storage space for printer, disk drive and micro. These have a starting price of £39.75 and come from International Data Automation Limited, 11 Station Parade, Virginia Water, Surrey GU25 4AB telephone 09904 4944.

## Warranties

Astronics Limited are offering an extended warranty scheme for most home computers including the VIC and the 64. The cost of this service to the user is £25 for three years and £35 for five years. From Astronics Limited, Unit 2, Eastern Industrial Estate, Jackson Close, Cosham, Portsmouth, Hants. PO6 1QW. Telephone 0705 326 223.



The hygiene side of computing (see Cleaning Kits).

## Cleaning Kits

An all-in-one cleaning kit comprises of disposable solvent applicators, wipes and cleaning cloths. There are also cleaners

## The 64 Spreadsheet

An electronic spreadsheet that can solve problems. It is possible to simulate any calculation situation and then apply it to a variety of problems. It holds the figures, shows them on the screen and can be applied to any calculation formulae the user puts in. Features include printing the results on a bar chart or saving results on a disk or cassette. £25.00 on cassette and £27.50 on disk. Abrasco Ltd, The Grange Barn, Pikes End, Eastcote, Middlesex. Telephone: 01-866 2518.

## Codewriter

A program which can be used to design a business information program in a language easy to understand - without programming. The user types in screen layouts and any calculations needed and the Codewriter will restructure them so that the computer can accept and use the information. Possible to write reports, print checks, letters etc. Comes on disk for the CBM 64. £85.00. Dynatech Software Ltd, rue du Commerce, Bouet, St Peter Port, Guernsey, C.I. Telephone: 0481 26081.

## EPROM

A 4K byte EPROM which runs any BASIC or Machine Code program stored in ROM, eliminating the need for tape or disc. Compatible with the PET. The cost is £25 plus VAT and it is available from Greenwich Instruments Limited, 22 Bardsey Lane, Greenwich, London SE10 9RF. Telephone 01-853 0868.

for the print wheel, buffer pads and sound shield. From ISA-GOLD, International Systems & Applications Limited, 80/84 Thornton Road, Bradford, West Yorkshire BD1 2DG. Telephone: 0274 306787.

## Assembler Development

Enables the user to program in assembler directly on the CBM 64. Provides all the tools the assembler programmer needs in order to create, assemble, load, and execute the 6510 assembly language. Also included is a full machine code monitor and a DOS wedge. Available on disk. £24.95. By Commodore. Tel: 0753 79292.

## EPROM

Uvipac allows up to three EPTOM's of any size or one CPU with an on-board EPROM to be erased in five to 10 minutes. This unit can be supplied with a 15 minute timer. On its own it costs £19.95 and with the timer £24.95. From Ground Control, Alfreda Avenue, Hullbridge, Essex SS5 6LT telephone 0702 230324.

## Assembler

An assembler/disassembler for the 64 that comes on a tape. This tape lets you program using 6510/6502 mnemonics as easily as if it were BASIC. It is priced at £9.99 from Micro Power, BCM 8713, London WC1N 3XX.

## Petspeed 64

A basic compiler allowing the user to speed up the execution of BASIC programs. It can compile any program written in basic without any changes needed. These programs can shorten processing time, disk handling and even print runs. Comes on disk for the CBM 64. By Commodore and costs £50.00 tel: 0753 79292.

Ask your dealer  
about these exciting  
new **Galactic Series 2000**  
2nd Generation games.

# 20 COMMODORE 64 HOME COMPUTERS TO BE WON

## PLUS 100 RUNNER UP PRIZES VIC20/CBM64 OR DRAGON JOYSTICKS

Galactic Software are giving away all these prizes to the lucky number winners, anyone who buys a Galactic Series 2000 game before Christmas could win!

For YOUR chance to win a prize simply fill in the entry form with your guess at one of the lucky numbers and send to us with the bottom right corner of the cassette cover of any Galactic game OR send your entry together with your order for any game. Our computer has chosen 120 random numbers between 1 and 10,000, one for each prize. The closest guess to each number wins the prize.

Closes Dec.24th 1983. A list of all the winners will be available.

In the future... in a galaxy far, far away, a second generation of games was created. They were time warped back to our dimension for you to experience, NOW.

The Galactic Series 2000 is here at last. Games for the VIC 20, Commodore 64 and Dragon 32.

All series 2000 games are only £5.50 each. Money back guarantee.

Unexp. VIC20 games - Keyboard or Joystick  
Commodore 64 games - Joystick control.  
Dragon 32 games -  
Keyboard control

Dealership enquiries contact 04605 5161

Galactic Software, Unit 7, Larchfield Estate, Dowlish Ford, Ilminster, Somerset. TA19 0PF. Tel:(04605) 5161.

ALTERNATIVE PRIZES  
OF DISK DRIVES OR  
PRINTERS FOR  
WINNERS WHO ALREADY  
OWN CBM64's



**Froggy**: Incredible animation in this high performance graphics experience. Frogs, trucks, cars, boats, logs, turtles and lilyponds all combined to give your brain a real workout.



**Space Shuttle**: Test your reflexes to the max as you attempt to rescue psychopathic scientists from the moon. Beware of the hazardous space fragments in this hectic challenge.



**Robot Mouse**: In this futuristic arcade game you collect atomic cheese from the floor of the space maze avoiding the mean malfunctioning robots who will on contact.



**3D Maze**: The ultimate maze game features brain power not fire power. A visually breathtaking 3 dimensional display with a tormenting time factor as the 4th dimension.

NEW  
RELEASES! THE PROGRAM THAT  
EVERYONE IS TALKING  
ABOUT

## GAMES DESIGNERS

VIC 20 COMMODORE 64  
£9.50 £11.50  
THESE FANTASTIC PROGRAMS  
ALLOW USERS TO EASILY DESIGN  
& MAKE THEIR OWN MACHINE  
CODE GAMES - USING FULL  
COLOUR & SOUND EFFECTS



**Neutron Zapper**: You pilot one of the best space ships ever built, but that's no protection in this galaxy. Your survival depends totally on the speed of your reflexes.

Tick the appropriate box.

Enclosed is the bottom right corner of a Galactic cassette cover.

Please send me the following game(s)

Froggy  Neutron Zapper  
 Bug Diver  3D Maze  
 Space Shuttle  Robot Mouse

My computer is **GAMES DESIGNERS**  
 Commodore 64  
 VIC20  Dragon 32

VIC 20 COMMODORE 64  
£9.50 £11.50

Here is my guess  
at one of the numbers  
I enclose cheque for the sum of £

or my Access no. is   
Name   
Address

# Galactic Software

ALL GAMES ONLY £5.50 EACH

# INTERCEPTOR MICRO'S

## 4 NEW RELEASES

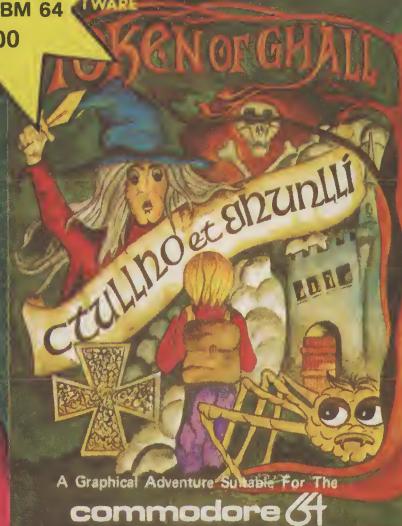
Our first utility  
program for the  
Commodore 64  
£7.00



An  
amazing new  
Arcade  
adventure  
on the  
Commodore 64  
£7.00



A graphical  
adventure on  
the CBM 64  
£7.00



A super new  
idea for an  
Arcade game  
Commodore 64  
£7.00



### DEALERS

GIVE US A RING ON  
(07356) 71145 FOR A  
GREAT DEAL!!  
FANTASTIC DISCOUNTS  
FREE PROMOTIONAL  
MATERIAL AND MOST  
IMPORTANT OF ALL,  
SUPERB SOFTWARE

NAME  
ADDRESS

SUITABLE FOR THE  
commodore 64

ASSEMBLER 64 (CBM 64)  VORTEX RAIDER (CBM 64)  
 TOKEN OF GHALL (CBM 64)  SIREN CITY (CBM 64)  
I enclose a cheque/P.O./Int. Money Order for £.....  
Send order with payment to:-  
Interceptor Micros  
Linden House  
The Green  
Tadley  
Hants.

# VIC 20 USERS!

## SWITCHABLE RAM PACKS

Plug into rear of Computer or into Motherboard

£55.20

\*32K SWITCHABLE to 3K, 16K, 24K, and 32K (block 5 or hi-res area)

£34.50

\*16K SWITCHABLE can be used with existing 8K Rampack

£18.40

\*4-SLOT MOTHERBOARDS – extends the capabilities of your Vic.

All prices include V.A.T. and p & p.

### SPECIAL OFFERS!!!

#### COMBINED PACKS –

16K Rampack and Motherboard  
£48.30!

32K Rampack and Motherboard  
£64.40!

#### ALSO! B.B.C. USERS!

Centronics/Parallel printer  
cable Complete for only  
£13.80!

## Alphascan Limited

Little Bourton House, Southam Road, Banbury, Oxon OX16 7SR  
Telephone: Cropredy (029 575) 8202.

Please supply:

cc12

.....	32K Rampacks	@ £55.20	£ .....
.....	16K Rampacks	@ £34.50	£ .....
.....	4-Slot Motherboards	@ £18.40	£ .....
.....	Combination Pack 16K	@ £48.30	£ .....
.....	Combination Pack 32K	@ £64.40	£ .....
.....	B.B.C. Centronics Cable	@ £13.80	£ .....

I enclose Cheque/P.O. value Total

Name .....

Address .....

(or) My Barclay/Access No. is

## DEALERS DEALERS DEALERS FRAME YOUR WAY INTO BIG BUSINESS

### COMMODORE

Computing  
International

DEALER  
BOXES

40 mm

58 mm

Dealer boxes at only £20, means you advertise to the *right* people through the *right* magazine.

*Only* Commodore computing can help you advertise to a local and international Commodore audience.

To make your booking telephone Sue Moisey on 01-636 6615 **NOW**

Future editorial will be directed towards new and potential Commodore owners as well as more experienced and business users. Therefore by advertising yourself as a dealer our readers will know where to buy their hardware and software.

# A Mixed Marriage—

We never refuse a challenge! Here Owen Murchott explains how he became convinced that it would be possible to connect any two machines which use the 6522 VIA chip. He decided to attempt a connection between a Commodore machine and the BBC Micro. Here are the results of his experiments.



Being rather locked-in to Commodore, with a PET 2001, a 4032, two VICs, a CBM64, a 4040 and a 1541 disk drive, and a whole load of software for them, I didn't want to acquire another make. Besides, it would have been an expensive experiment to buy a Sirius, for example. However, the kindly Computing Studies master, at my son's school came to my rescue. He agreed to lend me a BBC micro for the 1983 August holidays, and so I was able to try my idea. This article describes the discoveries I made using this machine.

#### Lack of documentation

My first discovery was that a BBC user is more or less on his own as far as the user port is concerned. There are two pages in the BBC user guide with factual information about it. Two other pages do show a little bit of program which reads and writes to the data register. For handshaking, the guide refers the reader to "other books", without naming them. But this is no criticism — the VIC and 64 user guides contain nothing except the user port pin assignments!

The two factual pages are key pages:

- \* Page 437 User port register addresses;
- \* Page 503 A circuit diagram showing user port connections.

#### SHEILA

I attended my first programming course in the mid '60s. In it, the course members heard that program labels could be any set of characters. The less mature members of our trainee group immediately filled their programs with 'FRED' labels and 'SON-OF-FRED', etc. They soon realised with the rest of us that it helps if labels are meaningful in some way. It was saddening, now in the '80s, to discover the memory-mapped I/O area labelled 'SHEILA' in the BBC user guide! Trivial micro-computer handbooks are all too common nowadays, and even Commodore are not altogether blameless. Some of the 'jokes' are awful! I'm not sure that they improve understanding; most people I talk to find them an insult to their intelligence. But I'm riding a hobby-horse here, and it is not what the article is supposed to be about.

The two factual pages were invaluable. With them, and with the knowledge

gleaned from previous experiments with my own machines, I did get the machines to communicate.

#### The Beeb's user port

There are five sets of connector pins set in a hollow on the underside of the machine. The centre set is the user port. It comprises a row of 10 pairs of pins.

I found that the user guide is ambiguous in the details in some diagrams. Different pages refer in different ways to the pins, and the diagram of external connections on page 499 does not appear to be drawn correctly. The only way I could be certain about the identity of the pins was to switch the machine on and use a test meter to identify first the two pins shown in the circuit diagram as +5V. These would be the only ones to show a reading. Connecting any other pins to ground would give 0V. In the absence of any unambiguous information, it seemed as good a way as any, and it worked! Having identified these two pins, I was able to deduce which way round the diagrams had been drawn.

Table 1 identifies the pins and gives

# Commodore and BBC

you their usage. Look at the user port from the front of the machine, with the keyboard uppermost. I have assigned odd numbers to the bottom pins, and even numbers to the top row, working from left to right. Pin 1 is bottom left, pin 2 is top left, etc. The names show which registers are connected to the pins. You will see, as I said earlier, that they are identical with the registers used in the VIC. I have defined the connections to make to a Commodore user port, with letters for identification as

The Commodore end – a standard 12-position edge connector as described in the first article in the series;

The BBC end – a 20-way cable mounting socket of the insulation-displacing type. (I used RS Components Ltd. stock number 469-881. Stock number 467-289 is an alternative);

A length of colour-coded twisted pair ribbon cable with 10 pairs (RS stock number 358-056) suited to the cable mounting socket.

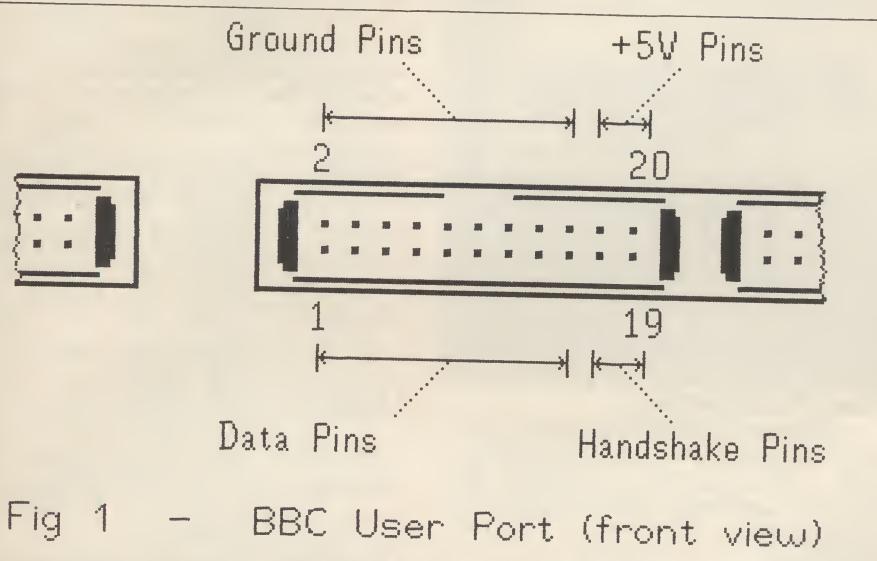


Fig 1 – BBC User Port (front view)

used in Commodore's manuals. For completeness, I have also given the connections to make to another BBC micro should you wish to connect two together.

#### The connector

You will need the following materials to make the physical connection:

#### Making up the socket

In case you have not made up this type of connector before, here are some detailed instructions.

The ribbon cable which I have specified has 10 colour coded wires. Round each is twisted a tan-coloured common conductor. Every so often the twist stops, and there is a flat section to make it easy to

Why should a magazine devoted to Commodore machines carry an article which digresses on to other hardware? This series is about how to connect different machines together and pass data between them.

On the whole, the number of differences between a PET and a CBM64 are about as many as the differences between the CBM64 and the BBC micro. And so are the number of similarities.

The BBC micro uses the 6522 VIA chip to control its user port. The particular registers it uses in this chip are the same ones as used by the VIC; only their address are different. But the CBM64 doesn't even use the same chip. This, then, is my excuse – it's not much different from writing about a Commodore machine and it opens up a lot of possibilities.

#### Tell your friends

There is another benefit from this article. It gives you sufficient details to show you how to connect two BBC micros together. Not only that, it is probably the first time that the details of how to do it have been published. So tell your friends with BBC micros where to come for information.

#### The experiment

When starting to write these articles, and learning that other machines use the 6522 VIA chip to control a user port, I thought it would be interesting to experiment. Perhaps it wouldn't be so difficult to connect an alien to my PET through the user port.

Pin	Name	Usage	Connect to CBM	BBC
1	PB7	Data	L	1
3	PB6	Data	K	3
5	PB5	Data	J	5
7	PB4	Data	H	7
9	PB3	Data	F	9
11	PB2	Data	E	11
13	PB1	Data	D	13
15	PB0	Data	C	15
17	CB2	Handshake out	B	19
19	CB1	Handshake in	M	17
2-16	OV	Ground	N	2-16
18-20	5V	Do not make any connection to these two pins		

# INTERFACING

mount a socket. Cut the ribbon halfway along a flat section, making a nice square edge. Part the rightmost two pairs from it, and cut their tan-coloured common conductors short by an inch or so, to make sure that they will not connect to the +5V pins. Follow them through, and cut them short at the other end, too.

Lay out the cable, with its end towards you, a coloured conductor leftmost (this will be connected to pin 1), and the two shortened common conductors on the right. You will see that the cable spacing is such that it mates with the grooves in the contacts on the socket housing. Slip the housing, face down, under the cable so that the cable is more or less flush with its edge. This edge will be the *underside* when it is plugged into the user port. Depending on the type of socket you have, watch out for any bumps which mate with slots surrounding the user port pins. Get it the right way round.

Push the locking clip onto its first locking point, making sure as you do so that the two loose coloured conductors lie in the same row of grooves as the other coloured conductors. When you are satisfied that the conductors are correctly seated, carefully use a vice to close up the locking clip to its second locking point. Fold the cable over the top, and press the strain relief clip into position to hold it.

Identify which colours relate to which pins. You can now solder the other end of the cable to the edge connector. Make the connections defined in Table 1. I actually only soldered four of the tan-coloured common conductors to pin N, and soldered the other four to pin 12 above it (also a ground pin) to give more room. Note that there should only be eight common conductors altogether arriving at the edge connector. Make sure that the other two are well out of the way.

Fix a protective cover in the way I described in the first article in this series. You will need to roll the ribbon connector before soldering the wires, so that it can emerge satisfactorily from the edge of this cover.

It may be that you intend to experiment with connecting two BBC micros together. In this case, make up the second end with a socket like the first; do it the same way. Don't forget that the two rightmost coloured conductors must be crossed over at this end, so that pin 17 of one connector is connected to pin 19 of the other. Otherwise the handshake will not work.

## The registers and addresses

In the second article of this series I gave you the addresses of the interface chip registers appropriate to the various Commodore machines. There were also

specific values which you had to poke to them.

The register addresses in the BBC micro are different, but the values to poke are the same as for the VIC. I have given the addresses in decimal and hexadecimal. Note the BBC convention, which uses ampersand (&) to identify hexadecimal rather than dollar (\$) as used by Commodore.

Table 2

* Data Register (DR)	65120	&FE60
* Data Direction (DD)	65122	&FE62
* Auxiliary Control (AC)	65131	&FE6B
* Peripheral Control (PC)	65132	&FE6C
* Handshake Enable (HE)	65132	&FE6C
* Handshake Output (HS)	65132	&FE6C
* Handshake 'Tidy' (HT)	65120	&FE60
* Interrupt Flags (IC)	65133	&FE6D

There is some duplication of addresses. In the second article I pointed out that some of the POKEs are redundant in some Commodore machines if my system for communication is used. I included them so that only one program is needed for all Commodore machines. I have left the redundancy in the programs with this article so that you can see directly the parallels with the VIC, and to keep it consistent. Its effect is just to add three extra variables.

## Don't POKE the Beeb

PEEK and POKE are not available in the BBC interpreter. Here are Microsoft and BBC equivalents, and for those not familiar with the BBC machine, an explanation:

POKE AC,0                    ?AC=0

The use of the question mark in ?AC is interpreted as:

The contents of the byte at the memory location defined by the value of AC.

So ?AC=0 means let the byte at this address have the value zero. Similarly, Z=?HT means let Z have the value of the byte at the address HT. The Microsoft equivalent would be Z=PEEK(HT).

If you are familiar with Assembler, you will by now have recognised an indirect addressing mechanism. To have this facility in BASIC is most useful. In the BBC micro, it replaces PEEK and POKE.

## Other BASIC differences

Commodore users will notice some slight differences in the use of DATA and GET. The BBC micro permits hexadecimal notation for values assigned to numeric variables. I have put the register addresses in the DATA statements in hexadecimal, to be consistent with the 'SHEILA' offset address given on page 437 of the user guide.

Z\$ = GET\$ is the valid BBC form of Microsoft's GET Z\$.

## Register values

The second article in this series gave you a detailed description of the register addresses for Commodore machines, and the values to be poked to them. Here, I have assumed that you saw the article, so have only summarised them for the BBC micro, in the same sequence in which they were presented in that article. The

way I have written them assumes that the register addresses above have first been assigned to variables:

* ?DD=n	To set the data direction: n=0 for input n=255 for output;
* ?DR=n	To place into the Data Register the value of a byte to be transmitted;
* Z=?DR	To get from the Data Register the value of a byte received;
* ?AC=0	To disable Auxiliary Control functions;
* ?PC=?PC AND 239	To enable recognition of a 1-0 handshake signal (1-0 is known as a "negative transition");
* ?HE=?HE OR 2	To enable handshake signals to be sent;
* ?HS=?HS AND 223	To send handshake signal 0;
* ?HS=?HS OR 224	To send handshake signal 1;
* Z=?HT	To ensure that the handshake bit is clear before transmission starts. (The value of Z is irrelevant);
* H=?IC AND 16	To test whether a handshake signal has been received yet. If it has not, H is zero.

## Two specimen programs

So that you have something to try, I have given a BBC version of two of my previous programs:

- \* KEYBOARD CONNECTOR from the second article in the series;
- \* HANDSHAKER from the third.

The programs are direct copies, laid out in the same way as before. I have made no attempt to use the program structuring capabilities of BBC BASIC. So you can make a direct comparison with

# INTERFACING

the previous versions, and no further explanation is necessary.

## Connecting other machines

Previous articles of mine showed you how to connect any two of PET/VIC/CBM64 through their user ports. In this article I have used the same principles, but modified, to connect any Commodore machine to the BBC micro. By doing this I have really pointed the way for you to connect any other make. The only constraint is that it should have an addressable user port with:

- \* 8 data contacts;
- \* 2 handshake contacts. Preferably, the input contact should be 'edge-sensitive' to minimise programming. That is, it should detect the *change* from 1 to 0, or 0 to 1, not the actual bit values (see article 2);
- \* At least one 'ground' contact.

You will need to know which contacts are which, the addresses of the registers which control them, and the locations of the bits which are used for the handshake. Make up a suitable cable to connect together the eight data contacts and the two handshake contacts. The handshake connections must cross over so that the output contact of one machine is connected to the input contact of the other.

When you POKE values to set or clear bits in chip registers, ensure that you do not alter any other bits. At least you should keep the same values as at power-up. If the user port employs the 6522 VIA, you can use the PEEKs and POKEs defined for PETs and VICs in this series, provided that the same registers and bits are used. If it is not the same chip, you will certainly need to acquire a memory map and details of the register assignments of the chip used. You may also have to use the registers in a



slightly unorthodox way.

I had to do this for the Commodore 64, for example. It uses the 6526 CIA (Complex Interface Adapter) instead of the 6522 VIA. If you look at a memory map for it, you will see that my 'Handshake Enable' register is, in fact, Data Direction Register A, and the handshake output line is named PA2 – a bit in Data Register A. But using this register meant that I could

use the same pins on the Commodore 64 user port connector as on the PET and the VIC. Thus one connector works for any machine.

You need to choose your handshake convention, i.e. 'negative transition' or 'positive transition' which I defined in article 2. Take note of the reasons I gave in that article for choosing a negative transition.

10 REM	HANDSHAKER - BBC MICRO	W.OWEN MURCOTT AUGUST 1983
11 REM		
20 REM		
21 :		
30 DATA &FE60,&FE62,&FE6B,&FE6C,&FE6C,&FE6C,&FE60,&FE6D,239,224,224,223,16		
52 REM		
70 READ DR,DD,AC,PC,HE,HS,HT,IC: REM		REGISTER ADDRESSES AND VALUES
80 READ K1,K2,K3,K4,K5: REM		
81 REM		
90 ?AC = 0: REM		SET UP REGISTER ADDRESSES
91 ?PC = ?PC AND K1: REM		SET UP REGISTER VALUES
92 ?HE = ?HE OR K2: REM		
93 Z = ?HT: REM	DISABLE AUXILIARY CONTROL FUNCTIONS	
94 ?HS = ?HS OR K3: REM	SET HANDSHAKE = 1-0	
95 REM	ENABLE HANDSHAKE	
100 H0 = ?HS AND K4: REM	ENSURE HANDSHAKE BIT IS CLEAR	
110 IF (?IC AND K5) THEN PRINT "LOSER": END: REM	SEND FIRST HANDSHAKE = 1	
120 Z\$ = GET\$: IF Z\$="" GOTO 110		READY TO SEND HANDSHAKE = 0
130 ?HS = H0: H = ?IC: REM		OTHER HAS SIGNALLED
140 IF (H AND K5) THEN PRINT "LOSER": END	SEND SIGNAL AND CHECK OTHER MACHINE	
150 PRINT "WINNER"		

## Isn't it time you stopped running your computer at printer speed?

*In ten seconds, your computer can output enough print data to keep your printer busy for five minutes, or longer.*

*Instead of waiting around for the printer, you could install a print buffer, and free your computer for its next task in seconds.*

*Print buffers take care of the printing — and the waiting. And the more you print, the more time a buffer will save.*

*For the Commodore 20/40/80 series, 16k and 48k in-line buffers from £125 + VAT. IEEE-488 input and output, or IEEE-488 input and Centronics — parallel output.*

*Serial or parallel buffers for any other combination of micro-computer and printer or plotter. Protocol conversion. RAM sizes from 2k to 256k. Trade and quantity discounts — please call.*

### A>Line Computer Systems

1 Church Farm Lane,  
Willoughby Waterleys,  
Leicestershire LE8 3UD.

Telephone:  
Peatling Magna (053 758) 486

**Talk to the specialists.  
We have the answers.**

## Superbase 64

TRANSFORMS THE COMMODORE 64 INTO A FULL-FEATURED AND PROFESSIONAL DATABASE SYSTEM! WITH UP TO 1000 CHARACTERS PER RECORD ON UP TO 4 SCREENS... AND UP TO 128 ITEMS PER RECORD, DEFINABLE AS KEY, TEXT, NUMERIC, CONSTANT, RESULT OR DATE... IN FILES OF UP TO 16M CHARACTERS! SUPERBASE EVEN HAS SPREADSHEET AND CALCULATOR CAPABILITY, CALENDAR FUNCTIONS, EASY INPUT FROM WORDPROCESSOR/DATA FILES, BOTH MENU-DRIVEN AND PROGRAM OPTIONS, SORTING/SEARCHING, FULLY DEFINABLE OUTPUTS... SUPERBASE 64 IS ESSENTIAL IF YOU WANT THE MOST FROM YOUR 64! SUPPLIED ON CBM 1541 DISK WITH EXCELLENT TUTORIAL/REFERENCE MANUAL. EX-STOCK NOW!

● OUR PRICE ONLY ~~£99.95~~ £88!

## VIZAWRITE 64

NOW AVAILABLE ON CARTRIDGE, VIZAWRITE 64 IS A HIGH-PERFORMANCE, LOW-COST WORD PROCESSOR WITH ON-SCREEN FORMATTING, THAT TAKES FULL ADVANTAGE OF THE 64'S COLOUR, GRAPHICS AND MEMORY FEATURES... AND SUPPORTS VIRTUALLY ANY PRINTER! WITH A COMPREHENSIVE AND EASY-TO- FOLLOW USER MANUAL, VIZAWRITE OFFERS THE ULTIMATE IN PERSONAL COMPUTER WORD PROCESSING! ALSO AVAILABLE ON DISK (OUR PRICE ~~£99.95~~ £65!), OR COMBINED WITH VIZASPELL (OUR PRICE ~~£99.95~~ £85!).

● OUR PRICE ONLY ~~£99.95~~ £68!

## Master 64

MASTER 64 IS A TOTALLY NEW CONCEPT... A COMPLETE PROGRAM DEVELOPMENT PACKAGE, THAT'S AVAILABLE NOW FOR THE CBM 64. MASTER HAS 85 NEW COMMANDS... AND BASIC IV TOO! PLUS PROGRAMMER'S TOOLKIT, MACHINE CODE MONITOR, BUSINESS BASIC, KEYED DISK ACCESS, SCREEN MANAGEMENT, USER-DEFINABLE INPUT ZONES, REPORT GENERATOR, 22-PLACE ARITHMETIC, DATE CONTROL, STRING FUNCTIONS, DISK DATA COMPRESSION, SCREEN PLOTTING, SCREEN DUMP, OPTIONAL SOFTWARE PROTECTION KEY, AND MORE... IN FACT EVERYTHING YOU NEED TO PROGRAM YOUR 64 TO TOP PROFESSIONAL STANDARDS! MASTER 64 COMES WITH A FULL USER REFERENCE MANUAL, QUICK REFERENCE GUIDE AND DEMO PROGRAMS. ALSO AVAILABLE FOR CBM 700 (£339.25) AND CBM 4032/8032/8096 (£339.25 £225!).

● SPECIAL OFFER PRICE ~~£149.95~~ £115!

THESE ARE JUST SOME OF OUR FINE SOFTWARE PRODUCTS FOR COMMODORE COMPUTERS... PLEASE TELEPHONE OR WRITE FOR FREE DATA SHEETS! PRICES SHOWN INCLUDE 15% VAT AND ARE CORRECT AT TIME OF GOING TO PRESS. ORDER BY POST/TELEPHONE/PRESTEL, USING CHEQUE, ACCESS, BARCLAY CARD OR OFFICIAL ORDER. TELEPHONE 01-546-7256 FOR SAME-DAY DESPATCH! POST FREE EXCEPT ON CREDIT/OVERSEAS ORDERS. (REF A23)

## Calco Software

LAKESIDE HOUSE, KINGSTON HILL, SURREY KT2 7QT TEL 01-546-7256

## CBM 8032

With MEGAROM your CBM8032 has routines for screen handling, validation, sorting and disk access. **This makes it a very powerful business machine.**

Order before 31st December, 1983 and you will receive a **free screen layout program** and a **free client records program**.

Only £50.00 plus VAT, but next year the price will be back at £75.00, **so do hurry!**

## Pi-Lok Systems Ltd.

Computing for the Small Business

313 Bury & Rochdale Old Road, Heywood, Lancs.  
Tel. 0706 69693

# INTERFACING

```

10 REM      KEYBOARD CONNECTOR - BBC MICRO      W.OWEN MURCOTT AUGUST 1983
11 REM
12 REM
13 REM      'VIA' REGISTER ADDRESS AND VALUES
14 :
15 DATA &FE60, &FE62, &FE6B, &FE6C, &FE6C, &FE6C, &FE60, &FE6D
16 DATA 239, 224, 224, 223, 16
17 REM
18 REM      SET UP REGISTER ADDRESSES
19 READ DR: REM      DATA REGISTER
20 READ DD: REM      DATA DIRECTION
21 READ AC: REM      AUXILIARY CONTROL
22 READ PC: REM      PERIPHERAL CONTROL
23 READ HE: REM      HANDSHAKE ENABLE
24 READ HS: REM      HANDSHAKE OUTPUT
25 READ HT: REM      HANDSHAKE 'TIDY'
26 READ IC: REM      INTERRUPT FLAGS
27 REM
28 READ K1: REM      SET UP REGISTER VALUES
29 READ K2: REM      TO DEFINE 1-0 HANDSHAKE
30 READ K3: REM      TO ENABLE HANDSHAKE TO BE SENT
31 READ K4: REM      TO SET HANDSHAKE=1
32 READ K5: REM      TO SET HANDSHAKE=0
33 REM      TO TEST HANDSHAKE RECEIVED
34 REM
35 ?AC = 0: REM      DISABLE AUXILIARY CONTROL FUNCTIONS
36 ?PC = ?PC AND K1: REM      SET HANDSHAKE = 1-0
37 ?HE = ?HE OR K2: REM      ENABLE HANDSHAKE
38 Z = ?HT: REM      ENSURE HANDSHAKE BIT IS CLEAR
39 ?HS = ?HS OR K3: REM      SEND FIRST HANDSHAKE = 1
40 REM
41 PRINT "PRESS R=RECEIVE S=SEND"
42 Z$ = GET$
43 IF Z$ = "R" THEN ?DD = 0: GOTO 300: REM      DATA DIRECTION = IN
44 IF Z$ = "S" THEN ?DD = 255: GOTO 200: REM      DATA DIRECTION = OUT
45 GOTO 101
46 REM
47 PRINT "PRESS RETURN TO END"
48 Z$ = GET$: IF Z$="" GOTO 210
49 GOSUB 1000: REM      WAIT 'READY TO RECEIVE'
50 ?DR = ASC(Z$): REM      SEND CHARACTER
51 GOSUB 2000:REM      SEND 'CHARACTER SENT'
52 IF Z$ <> CHR$(13) GOTO 210
53 END
54 :
55 GOSUB 2000: REM      SEND 'READY TO RECEIVE'
56 GOSUB 1000: REM      WAIT 'CHARACTER SENT'
57 A = ?DR: REM      GET CHARACTER
58 IF A = 13 THEN PRINT: PRINT "END": END
59 PRINT CHR$(A);
60 GOTO 300
61 REM
62 IF (?IC AND K5) = 0 GOTO 1000: REM      WAIT HANDSHAKE
63 RETURN
64 REM
65 ?HS = ?HS AND K4: REM      SEND HANDSHAKE = 0
66 ?HS = ?HS OR K3: REM      SEND HANDSHAKE = 1
67 RETURN

```

# HINTS & TIPS

This month our selection of useful routines and tips for Commodore machines include a machine code append for the 64, a warning about disk id numbers and a solution to SAVE and LOAD troubles in programs that incorporate sprites.

## Append

The first routine that we have for you this month is a machine code append routine for the 64. This is a very useful routine for those of you who have entered our loaders and wish to use them in conjunction with a main program.

The concept of Append is to string a program on cassette or disk onto the end of the program that is currently in memory. Usually when doing a load, the program loaded is done so over the top of

the residing program thus wiping it out. What this routine does is to find the end of the original Basic program and load the next program from there onwards. Then the pointers in the new program are reset to continue on (otherwise they would point back into the original program).

This is nearly it except that the variable pointers are now pointing to within the current program. These have to be set to the end of the appended program by scanning through the lines until the end is found and then setting the pointers for variables to the first byte of free RAM after

that. This must be after the two zero's to mark the end of the program.

It must be remembered that the line numbers of the appended program are greater than any of the current program's, otherwise when listing the program after the append, the line numbers will suddenly drop back to the numbers of the appended program.

To call this routine, enter SYS49152"filename",dev. Where filename is the filename of the program that you wish to append and dev is the device number that the program is stored on.

READY					
PC	SR	AC	XR	YR	SP
0000	32	00	00	00	F6
0001	00	00	00	00	00
0002	00	00	00	00	00
0003	00	00	00	00	00
0004	00	00	00	00	00
0005	00	00	00	00	00
0006	00	00	00	00	00
0007	00	00	00	00	00
0008	00	00	00	00	00
0009	00	00	00	00	00
000A	00	00	00	00	00
000B	00	00	00	00	00
000C	00	00	00	00	00
000D	00	00	00	00	00
000E	00	00	00	00	00
000F	00	00	00	00	00
0010	00	00	00	00	00
0011	00	00	00	00	00
0012	00	00	00	00	00
0013	00	00	00	00	00
0014	00	00	00	00	00
0015	00	00	00	00	00
0016	00	00	00	00	00
0017	00	00	00	00	00
0018	00	00	00	00	00
0019	00	00	00	00	00
001A	00	00	00	00	00
001B	00	00	00	00	00
001C	00	00	00	00	00
001D	00	00	00	00	00
001E	00	00	00	00	00
001F	00	00	00	00	00
0020	00	00	00	00	00
0021	00	00	00	00	00
0022	00	00	00	00	00
0023	00	00	00	00	00
0024	00	00	00	00	00
0025	00	00	00	00	00
0026	00	00	00	00	00
0027	00	00	00	00	00
0028	00	00	00	00	00
0029	00	00	00	00	00
002A	00	00	00	00	00
002B	00	00	00	00	00
002C	00	00	00	00	00
002D	00	00	00	00	00
002E	00	00	00	00	00
002F	00	00	00	00	00
0030	00	00	00	00	00
0031	00	00	00	00	00
0032	00	00	00	00	00
0033	00	00	00	00	00
0034	00	00	00	00	00
0035	00	00	00	00	00
0036	00	00	00	00	00
0037	00	00	00	00	00
0038	00	00	00	00	00
0039	00	00	00	00	00
003A	00	00	00	00	00
003B	00	00	00	00	00
003C	00	00	00	00	00
003D	00	00	00	00	00
003E	00	00	00	00	00
003F	00	00	00	00	00
0040	00	00	00	00	00
0041	00	00	00	00	00
0042	00	00	00	00	00
0043	00	00	00	00	00
0044	00	00	00	00	00
0045	00	00	00	00	00
0046	00	00	00	00	00
0047	00	00	00	00	00
0048	00	00	00	00	00
0049	00	00	00	00	00
004A	00	00	00	00	00
004B	00	00	00	00	00
004C	00	00	00	00	00
004D	00	00	00	00	00
004E	00	00	00	00	00
004F	00	00	00	00	00
0050	00	00	00	00	00
0051	00	00	00	00	00
0052	00	00	00	00	00
0053	00	00	00	00	00
0054	00	00	00	00	00
0055	00	00	00	00	00
0056	00	00	00	00	00
0057	00	00	00	00	00
0058	00	00	00	00	00
0059	00	00	00	00	00
005A	00	00	00	00	00
005B	00	00	00	00	00
005C	00	00	00	00	00
005D	00	00	00	00	00
005E	00	00	00	00	00
005F	00	00	00	00	00
0060	00	00	00	00	00
0061	00	00	00	00	00
0062	00	00	00	00	00
0063	00	00	00	00	00
0064	00	00	00	00	00
0065	00	00	00	00	00
0066	00	00	00	00	00
0067	00	00	00	00	00
0068	00	00	00	00	00
0069	00	00	00	00	00
006A	00	00	00	00	00
006B	00	00	00	00	00
006C	00	00	00	00	00
006D	00	00	00	00	00
006E	00	00	00	00	00
006F	00	00	00	00	00
0070	00	00	00	00	00
0071	00	00	00	00	00
0072	00	00	00	00	00
0073	00	00	00	00	00
0074	00	00	00	00	00
0075	00	00	00	00	00
0076	00	00	00	00	00
0077	00	00	00	00	00
0078	00	00	00	00	00
0079	00	00	00	00	00
007A	00	00	00	00	00
007B	00	00	00	00	00
007C	00	00	00	00	00
007D	00	00	00	00	00
007E	00	00	00	00	00
007F	00	00	00	00	00
0080	00	00	00	00	00
0081	00	00	00	00	00
0082	00	00	00	00	00
0083	00	00	00	00	00
0084	00	00	00	00	00
0085	00	00	00	00	00
0086	00	00	00	00	00
0087	00	00	00	00	00
0088	00	00	00	00	00
0089	00	00	00	00	00
008A	00	00	00	00	00
008B	00	00	00	00	00
008C	00	00	00	00	00
008D	00	00	00	00	00
008E	00	00	00	00	00
008F	00	00	00	00	00
0090	00	00	00	00	00
0091	00	00	00	00	00
0092	00	00	00	00	00
0093	00	00	00	00	00
0094	00	00	00	00	00
0095	00	00	00	00	00
0096	00	00	00	00	00
0097	00	00	00	00	00
0098	00	00	00	00	00
0099	00	00	00	00	00
009A	00	00	00	00	00
009B	00	00	00	00	00
009C	00	00	00	00	00
009D	00	00	00	00	00
009E	00	00	00	00	00
009F	00	00	00	00	00
00A0	00	00	00	00	00
00A1	00	00	00	00	00
00A2	00	00	00	00	00
00A3	00	00	00	00	00
00A4	00	00	00	00	00
00A5	00	00	00	00	00
00A6	00	00	00	00	00
00A7	00	00	00	00	00
00A8	00	00	00	00	00
00A9	00	00	00	00	00
00AA	00	00	00	00	00
00AB	00	00	00	00	00
00AC	00	00	00	00	00
00AD	00	00	00	00	00
00AE	00	00	00	00	00
00AF	00	00	00	00	00
00B0	00	00	00	00	00
00B1	00	00	00	00	00
00B2	00	00	00	00	00
00B3	00	00	00	00	00
00B4	00	00	00	00	00
00B5	00	00	00	00	00
00B6	00	00	00	00	00
00B7	00	00	00	00	00
00B8	00	00	00	00	00
00B9	00	00	00	00	00
00BA	00	00	00	00	00
00BB	00	00	00	00	00
00BC	00	00	00	00	00
00BD	00	00	00	00	00
00BE	00	00	00	00	00
00BF	00	00	00	00	00
00C0	00	00	00	00	00
00C1	00	00	00	00	00
00C2	00	00	00	00	00
00C3	00	00	00	00	00
00C4	00	00	00	00	00
00C5	00	00	00	00	00
00C6	00	00	00	00	00
00C7	00	00	00	00	00
00C8	00	00	00	00	00
00C9	00	00	00	00	00
00CA	00	00	00	00	00
00CB	00	00	00	00	00
00CC	00	00	00	00	00
00CD	00	00	00	00	00
00CE	00	00	00	00	00
00CF	00	00	00	00	00
00D0	00	00	00	00	00
00D1	00	00	00	00	00
00D2	00	00	00	00	00
00D3	00	00	00	00	00
00D4	00	00	00	00	00
00D5	00	00	00	00	00
00D6	00	00	00	00	00
00D7	00	00	00	00	00
00D8	00	00	00	00	00

# HINTS & TIPS

```
10 I=49152:T=0
20 READA
30 IFA=-1THEN50
40 POKEI,A:I=I+1:T=T+A:GOTO20
50 IFT<9910THENPRINT"DATA ERROR":END
60 PRINT"DATA OKING"
70 PRINT"USE SYS49152"CHR$(34)"FILENAME"CHR$(34)",DEV"
80 PRINT"APPEND FILENAME."
90 END
100 DATA169,0,133,10,32,212,225
110 DATA165,45,56,233,2,170,165
120 DATA46,233,0,168,165,10,32
130 DATA213,255,32,51,165,165,45
140 DATA164,46,56,233,2,133,87
150 DATA152,233,0,133,88,160,0
160 DATA177,87,208,27,208,177,87
170 DATA208,22,165,87,24,105,2
180 DATA133,45,133,47,133,49,165
190 DATA88,105,0,133,46,133,48
200 DATA133,50,96,160,0,177,87
210 DATA133,89,208,177,87,133,88
220 DATA165,89,133,87,76,40,192,-1
READY.
```

## Tape headers

We have had a few enquiries about the way that a tape header is stored on the tape and how it is stored when it reaches the machine. The information that we have here is specifically for the 64 but it might be so for the PET and the VIC.

When the computer is told to load a program, it reads the tape searching for the start of a file and when it has found one, it checks the filename. If this is correct, the load routine then loads the program. Now, at the point of found, the tape header is stored in the cassette buffer. This header consists of four items; the secondary address when saved (1 byte), the start address of loading (2 bytes lo-hi order), the end address of loading (2 bytes lo-hi order), and the actual file name.

So far this is all straightforward. The thing that surprised us was that from here on, the tape buffer is not used, the program is then loaded directly into the memory that it was intended to go in to. Therefore, the tape header is still there even after the load has been completed.

We know more, but certain software companies would not be very happy if we made that knowledge public. Experiment and see what you find.

## Tape SAVE and LOAD

This is an informative letter we received from a reader called Sid Phillips:

Recently I purchased a CBM 64 computer and was plagued by 'SAVE' and 'LOAD' troubles mostly when 'SPRITES' were incorporated in my programs.

With the aid of an oscilloscope the source was traced to interference from the Sprite Generator.

One way to eliminate this problem is to enter a statement as follows:-

POKE 53296,0:SAVE"program name"

This line turns 'off' the Sprite Enable Register located at 53296 (\$D015 hex) and then makes the save to tape.

When loading a new program after running Sprites previously and the power has not been turned off, then load with the following entry:-

POKE 53269,0:LOAD"program name"

The poke disables all sprites and loading should go as planned.

Your magazine is a constant source of useful information, please express my thanks to all writers who have helped provide fascinating reading.

(Technical Ed: Thank you Mr Phillips for the useful information that you have sent us. Your thanks have been passed on.)

## Disk's identity crisis

This is more of a warning to all of those users who own disk drives. We have found, from our own experiences, that the id number on disks is not just for us to use as an identifier. The computer also uses this id number for its own purposes. If you have a disk with a certain id and you do not initialise the drive before using another disk with the same id number, when the disk is written to, the BAM is updated.

If the disk has the same id number as the last one written to, the BAM stored will be used when writing. The BAM stands for Block Availability Map and it tells the DOS where on the disk there is free space. It should be obvious that if you write to one disk whilst the other disks' BAM is stored, something might be overwritten and this could have disastrous results.

# HINTS & TIPS

## Old restoration

To finish off this month we have another machine code routine for the 64. As with the first part, this routine could easily be converted to work on the other Commodore machines.

This routine does the opposite of the NEW command in that it restores a Basic program when a new has been performed. The routine actually scans the Basic program to find the end of the first line and restores the pointer to that line.

All the pointers are then rechecked to each line and finally the same routine as the append routine is used to scan to the end of the program and set the variable pointers.

To call this routine:- type SYS49280.

```

READY.

E9
  PC  SR  AC  XR  YR  SP
  ;303E 32 00 83 00 F6

  C080  A5 2B    LDA $2B
  C082  18    CLC
  C083  69 04    ADC #$04
  C085  85 57    STA $57
  C087  A5 2C    LDA $2C
  C089  69 00    ADC #$00
  C08B  85 58    STA $58
  C08D  A0 00    LDY #$00
  C08F  B1 57    LDA ($57),Y
  C091  F0 10    BEQ $C0A3
  C093  A5 57    LDA $57
  C095  18    CLC
  C096  69 01    ADC #$01
  C098  85 57    STA $57
  C09A  A5 58    LDA $58
  C09C  69 00    ADC #$00
  C09E  85 58    STA $58
  C0A0  4C 8F C0  JMP $C08F
  C0A3  A5 57    LDA $57
  C0A5  A0 00    LDY #$00
  C0A7  18    CLC
  C0A8  69 01    ADC #$01
  C0AA  91 2B    STA ($2B),Y
  C0AC  C8    INY
  C0AD  A5 58    LDA $58
  C0AF  69 00    ADC #$00
  C0B1  91 2B    STA ($2B),Y
  C0B3  20 33 A5  JSR $A533

  C0B6  A5 2D    LDA $2D
  C0B8  A4 2E    LDY $2E
  C0BA  38    SEC
  C0BB  E9 02    SBC #$02
  C0BD  85 57    STA $57
  C0BF  98    TYA
  C0C0  E9 00    SBC #$00
  C0C2  85 58    STA $58
  C0C4  A0 00    LDY #$00
  C0C6  B1 57    LDA ($57),Y
  C0C8  D0 19    BNE $C0E3
  C0CA  C8    INY
  C0CB  B1 57    LDA ($57),Y
  C0CD  D0 14    BNE $C0E3
  C0CF  A5 57    LDA $57
  C0D1  18    CLC
  C0D2  69 02    ADC #$02
  C0D4  85 2D    STA $2D
  C0D6  85 2F    STA $2F
  C0D8  85 31    STA $31
  C0DA  A5 58    LDA $58
  C0DC  85 2E    STA $2E
  C0DE  85 30    STA $30
  C0E0  85 32    STA $32
  C0E2  60    RTS
  C0E3  A0 00    LDY #$00
  C0E5  B1 57    LDA ($57),Y
  C0E7  85 59    STA $59
  C0E9  C8    INY
  C0EA  B1 57    LDA ($57),Y
  C0EC  85 58    STA $58
  C0EE  A5 59    LDA $59
  C0F0  85 57    STA $57
  C0F2  4C 04 C0  JMP $C0C4

```

## HINTS & TIPS

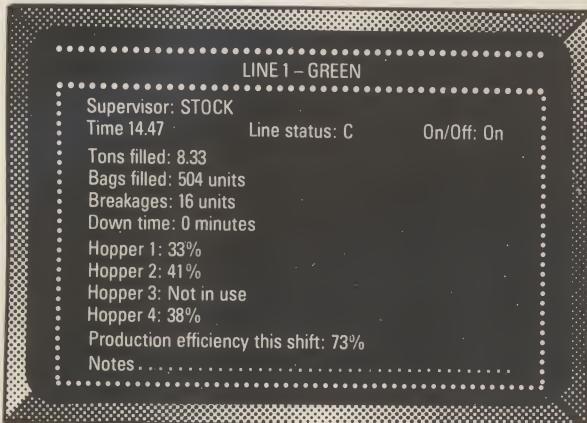
```
10 I=49280:T=0
20 READA
30 IF A=-1 THEN 50
40 POKE I, A: I=I+1: T=T+A: GO TO 20
50 IF T>12062 THEN PRINT "DATA ERROR": END
60 PRINT "DATA OK"
70 PRINT "USE SYS49280 TO RESTORE PROGRAM"
80 NEW
100 DATA 165, 43, 24, 105, 4, 133, 87
110 DATA 165, 44, 105, 0, 133, 88, 160
120 DATA 0, 177, 87, 240, 16, 165, 87
130 DATA 24, 105, 1, 133, 87, 165, 88
140 DATA 105, 0, 133, 88, 76, 143, 192
150 DATA 165, 87, 160, 0, 24, 105, 1
160 DATA 145, 43, 200, 165, 88, 105, 0
170 DATA 145, 43, 32, 51, 165, 165, 45
180 DATA 164, 46, 56, 233, 2, 133, 87
190 DATA 152, 233, 0, 133, 88, 160, 0
200 DATA 177, 87, 208, 25, 200, 177, 87
210 DATA 208, 20, 165, 87, 24, 105, 2
220 DATA 133, 45, 133, 47, 133, 49, 165
230 DATA 88, 133, 46, 133, 48, 133, 50
240 DATA 96, 160, 0, 177, 87, 133, 89
250 DATA 200, 177, 87, 133, 88, 165, 89
260 DATA 133, 87, 76, 196, 192, -1
READY.
```

The slip of a scalpel cut out a line from our Adventure Games program in the November issue (Vol 2 no 7). The missing line was:

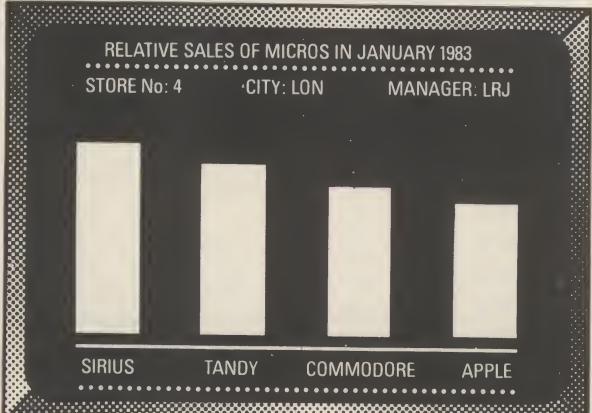
9000 IF RND(1)>0.07 THEN RETURN

- - By pressing the cursor down key
- - By pressing the cursor down key with the shift key
- - By pressing the cursor right key
- - By pressing the cursor right key with the shift key
- - By pressing the home key
- - By pressing the home key with the shift key
- - By pressing the control key and key 1
- - key 2
- - key 3
- - key 4
- - key 5
- - key 6
- - key 7
- - key 8
- - key 1
- - key 2
- - key 3
- - key 4
- - key 5
- - key 6
- - key 7
- - key 8
- - key 9
- - key 0
- - By pressing key F1
- - By pressing key F2
- - By pressing key F3
- - By pressing key F4
- - By pressing key F5
- - By pressing key F6
- - By pressing key F7
- - By pressing key F8

# Hundreds of problems. One solution.



Controlling the production of tomato grow bags may sound simple enough, but co-ordinating *all* the different aspects on a brand-new production line was not without its headaches. When the production manager turned to the company's new micro for an answer, it was THE LAST ONE which made it possible to create a system in hours rather than months. TLO then went on to produce over *one hundred* individual solutions for this company in a period of less than a year.



A simple, moving, graphic display was needed by a major computer retailer to demonstrate how a new product line could maintain compatibility with some of his earlier machines. Half an hour's work with THE LAST ONE and he had a program displaying bar-charts, graphs and printouts. Little more than an hour later the same program was up and running on three other makes of micro. When asked what made the four machines compatible, he laid the credit squarely with THE LAST ONE - "some manufacturers would be hard put to even use the same mains plug - TLO at least gets them all speaking the same language."

Using a computer to solve a complex problem is not always as easy as it sounds.

A product called THE LAST ONE however, has helped crack hundreds of computer problems for users throughout the world.

Launched less than two years ago, TLO allows any computer user to design, develop and modify, accurate and complete solutions without needing to understand the complex code languages used by the machine in question.

Now in use in installations from major clearing banks to one-man businesses, TLO is helping solve in hours, problems which used to take days, weeks and months.

**AT £330, IT'S A MIRACLE.**

**AT £50, IT'S A GIFT!**

A new fully operational Compact version of TLO is now available. Designed primarily for the occasional user wanting to harness the power of the world's leading program generator, it costs a highly competitive £50 (+VAT), and this is *refunded* should you subsequently upgrade to the Professional version.

The Professional multi-file version of TLO includes new time-saving features and costs from £185 to £330 (+VAT) according to the hardware installation.

TLO runs on the Apple II and IIe, Commodore 4032 and 8032/96, TRS-80 Model II (TRSDOS or CP/M), most CP/M, CP/M 86 and MS/DOS machines including the IBM PC (PC-DOS), Wang PC, Zenith Z100, and Sirius.

Find out what TLO can do for you by contacting your local dealer or send for an information pack.

It could be the solution to hundreds of *your* problems.

# THE LAST ONE®

# LETTERS

Errors in programs published in magazines seem to be the biggest single complaint that readers have against computer magazines. Unfortunately for us, all computer magazines tend to get lumped together. This is a shame because we're not like the others.

All our programs are tested on our own Commodore machines here in the office and then printed out. We use the printout as artwork leaving very little margin for error. We hate to admit it but it is almost (but not quite) inevitable that the odd error will creep in. We will continue to strive for perfection, of course.

Our experience has shown that the vast majority of complaints we receive are the result of a mistake on the part of the programmer. And this is almost always the result of the failure to understand the cursor characters on the Commodore machines.

In future we will do our best to explain everything as clearly as possible. Mean-

Dear Sir,

This letter is an expression of puzzlement or, more precisely, an expression of bewildered disbelief.

With the reasonable expectation of any consumer, I bought your magazine in the belief that it contained material which fulfilled its purpose. However you seem to be satisfied to market a product which, in some instances, is a deception. I refer specifically to some of the computer programs that you print.

I fail to understand how producers of a technical magazine can justify errors, repeated errors, in that area of technology which is presumably their specialty.

If you print a computer program which, because of errors in the program, does not work, then that must mean that you did not verify the program by running it through a computer. Inasmuch as you print the program with restriction as to its use in a particular computer, then it should work in that computer. But some of your programs designated suitable for the Commodore 64, do NOT work in our Commodore 64.

It seems to me that that is comparable to an automobile accessories manufacturer stipulating that a product is for use on a certain make and model of car and, if the consumer finds that it is not usable on that make and model of car, then the REPUTABLE manufacturer will, in the normal course of events, refund the cost of the product and withdraw it from sale.

## THE ADDRESS TO WRITE TO IS:

QUERIES, Commodore Computing International,  
167-169 Great Portland Street, London W1.

## THE TELEPHONE NUMBER TO CALL IS:

01-636 6531 (remember - Thursday afternoons, 2 pm till 5 pm)

while we would refer readers back to the User Manual.

The following letters are typical of the many we receive.

Dear Sir,

As a relative newcomer to the world of home computing, a step which I may have taken much too late in life, I am finding it somewhat difficult to do my own programming. I feel sure there must be others like me who, as a result, have relied upon the skills of those more capable. In doing so, I have tried, many times to type in printed programs from the many magazines on the subject.

To date I have failed miserably to get any such effort to work without fault on my Commodore 64. In the main, the programs are so badly printed often on poor quality paper, that one has extreme difficulty in deciphering the graphics, or they are so badly constructed that they

In magazine publishing speculative or experimental material, one should expect divergent views and subsequent revisions, but certainly one should not expect, AS A REGULAR PROCEDURE, corrections to be made in a technical magazine on computers.

"... as a regular procedure ...". Two of the magazines addressed in this letter have columns devoted to corrections of errors made in programs published in a previous issue. A third magazine refers the computer to line 5140 of the program, when, in fact, the last line of the program is 1810. Could that program have been verified in a computer before being published?

The fourth magazine *Commodore Computing International* seems to publish verified programs because we have found no errors in the programs used.

In conclusion, I await a refund of two dollars and seventy-five cents (\$2.75) from *Computing Now*, Electronics Today International; a refund of three dollars and fifty cents (\$3.50) from *Compute Gazette*, Compute Publications Inc; a refund of three dollars and twenty-five cents (\$3.25) from *Compute*, Compute Publications Inc.

Inasmuch as the editors of three of the four magazines bought seem to assume that technical data is expected to be erroneous, I have included reference to the fourth magazine, *Commodore Computing International*, for the edification of those editors and as a commendation to

need correction. This leads me to believe that the producers of these magazines are doing an injustice to the home computer market and, rather than being an encouragement to the expansion, are a deterrent.

I know I am generalising but as I have yet to come across such a program that I can type in and RUN without a mistake occurring I think I am entitled to generalise! For the time being at least.

**Ken Whiteley**  
**Hemel Hempstead,**  
**Herts.**

We could find no better reply to Ken Whiteley's letter, and those others who might agree with him, than to publish the following letter from one of our many North American readers. This letter was also sent to the editors of *Computer*, *Compute Gazette* and *Computing Now*.

the editor of the one magazine which seems to be published in a spirit of technical and financial honesty.

**Leslie E Murphy**  
**Montreal,**  
**Canada.**

Needless to say this is the sort of letter we love to read!

Dear Sir,

One of our customers, Stephen Gray, has written to us with a list of scores he has achieved whilst playing our PET arcade games. To our knowledge they are records, but it may be that some of your readers will dispute this.

GAME	SCORE
ASTEROIDS	8740
ASTEROIDS 2	20340
COSMIC ALIENS	150000
CRAZY KONG	53500
SUPER GLOOPER	108960
METEORITES	156940
PET PANIC	10390
SCRAMBLE	194860
BLAKATAK	117000
TANK ZONE	12230

I would be most grateful if you could publish this list and invite readers to contact you if they have recorded higher scores.

**Peter Calver**  
**Supersoft,**  
**Harrow,**  
**Middx.**

## TELEPHONE ENQUIRIES

If you are really desperate for an answer and feel you really cannot wait for a published reply you can use our telephone enquiry service. We will have two of our staff standing-by every Thursday afternoon between 2 pm and 5 pm. That's when we want to hear from you.

# CHARGET – the miraculous routine

When the command RUN is typed on the screen followed by a carriage return the operating system interprets this as a direct command and searches through its list of reserved words to find the address of the subroutine to perform this command. The RUN subroutine is located at address C775 its first functions are to set all the pointers to the start of the program, above all active 1/0 channels and restore all subroutine and data pointers.

Having done this, the first line of the Basic program is fetched using a subroutine located in page zero of memory,

the command is executed and the next line fetched with the line fetch subroutine checking for spaces and more than one command on a line. This line fetch subroutine in page zero is of great interest since it opens up the possibility of adding additional commands to Basic.

For this reason it is worth looking at this subroutine closely, it is loaded into memory from locations 194 to 217 during system initialisation by a subroutine located at 57525.

The reason why this subroutine is relocated from ROM to RAM is that it

requires a variable load address which points to the current byte of Basic program text being accessed. This variable load address or pointer to source text is stored in locations 201 and 202 and the first function of the subroutine is to increment this pointer to point to the next location which is then read and stored in the processor's accumulator. The remainder of the subroutine checks to see if the character obtained is either a colon, indicating the end of a statement, or a space if it is a space then the next is obtained.

The subroutine is as follows:

```

002  CHAR  E6 77  INC Z  C9  :increment character pointer
                                low byte
        D0 02  BNE    02  :test if low byte =255 if true
                                then

        E6 78  INC Z  CA  :increment character pointer
                                high byte

        GET    AD *** LDA    *** :get character from address in
                                201 and 202
        C9 3A  CMP IMM  3A  :is character a colon
        B0 0A  BCS END  :if so go to END
        C9 20  CMP IMM  20  :is character a space
        F0 EF  BEQ CHAR :if so go to CHAR
        38      SEC
        E9 30  SBC  30
        38      SEC

```

# INSIDE BASIC

E9 00	SBC 00	
END	60	RTS
		:return from subroutine to main program

(the asterisks are used to show that the contents of these two bytes 201 and 202 are variable).

By inserting extra code into this subroutine by replacing the first six bytes with a couple of jump to subroutine

instructions each Basic command can be intercepted before it is performed. The first subroutine would be the main block of new code to perform whatever function we want to add to the PETs commands the second subroutine performs the function

of the six bytes replaced by the two JSR instructions.

Thus if our new program starts at location 1A00 hex then the following six bytes could be inserted into the CHARGOT area:

00C2	CHARGOT	20 00 1A	JSR 1A00	:main subroutine
------	---------	----------	----------	------------------

		20 00 1F	JSR 1F00	:update pointer subroutine
GET		AD ***	LDA ***	

The subroutine at 1F00 would be:

1F00	POINTER	E6 77	INC Z C9	:increment pointer 201 (low byte)
------	---------	-------	----------	-----------------------------------

		00 02	BNE 02	:if low byte = 255 then increment
--	--	-------	--------	-----------------------------------

202

		E6 78	INC Z CA	:pointer 202 (high byte)
--	--	-------	----------	--------------------------

END		60	RTS	:return to main program
-----	--	----	-----	-------------------------

An easy way of detecting new commands is to precede them by a particular character such as the dollar sign then just use a small subroutine to detect if the first character in a command is a dollar sign if it is then that command is executed by the new software rather than the existing interpreter. Thus for example a graph plotting command could be

added to plot a point on the screen using double density graphics (see the program for this in the section on the video display) with a command like SPLOT X,Y where X and Y are the X and Y co-ordinate values.

The range of commands is very large and includes functions like the example just given and commands governing the operation of peripherals such as A/D

converters, or disk units. The ability to intercept each command before it is executed need not only be applied to adding extra commands to Basic it can also be used to monitor the execution of a program. This allows one to construct a very powerful diagnostic aid known as a trace program this slows down the running of a Basic program and displays each line on the screen as it is executed.

# 16 defined function keys

In this month's section we have a useful program for the 64 which defines the function keys of the 64, a game called frog for the 40 column PET's, one game for the unexpanded VIC, and one game that will work on all machines.

```
1 REM * SAVE PROGRAM BEFORE RUNNING *
2 REM ****
3 REM *
4 REM *      DEFINED KEYS FOR CBM 64 *
5 REM *
6 REM *      D & J.GARDINER 29.8.83 *
7 REM *
8 REM ****
9 REM
10 REM ****
11 REM *
12 REM * DO NOT TYPE REMS ABOVE 82 *
13 REM *
14 REM ****
15 FORI=38600TO38719:READI$*
16 H=ASC(LEFT$(I$,1))-48:IFH>9THENH=H-7
17 E=ASC(RIGHT$(I$,1))-48:IFE>9THENE=E-7
18 D=H*16+E:POKEI,D:NEXT
19 DATA78,A9,DC,8D,14,03,A9,96
20 DATA8D,15,03,58,85,38,A9,00
21 DATA85,37,60,EA,EA,48,8A,48
22 DATA98,48,A5,C5,C5,FB,F0,4E
23 DATA85,FB,EA,A2,00,A0,8D,02
24 DATA88,C0,00,F0,09,8A,18,69
25 DATA20,AA,88,18,90,F3,E0,60
26 DATA30,02,A2,60,EA,EA,A5,C5
27 DATA80,03,84,FE,C5,FE,F0,11
28 DATAE8,E8,E8,E8,E8,E8,E8
29 DATAE8,C0,07,D0,E0,4C,36,97
30 DATAEA,8A,85,FC,A9,96,85,FD
31 DATA80,00,B1,FC,99,77,02,C8
32 DATA80,08,D0,F6,84,C6,68,A8
33 DATA68,AA,68,4C,31,EA,00,FF
34 FORX=0TO15:READI$*
35 L=LEN(I$):IFL>8THENPRINTX;I$:PRINT"8 CHARACTERS MAXIMUM":END
36 FORY=1TO8
37 IFY>LTHENP=0:GOTO39
38 P=ASC(MID$(I$,Y,1)):IFP=95THENP=13
39 POKE38399+Y+X*8,P:NEXTY,X
40 PRINT"3 FUNCTION KEYS DEFINED":CLR
41 PRINT"3 PRESS RETURN TO ENABLE KEYS NOW 3"
42 PRINT"SYS38600TTI"
43 NEW
44 REM -----
45 REM      WITH SHIFT KEY NOT PRESSED
46 REM      F7  F1  F3  F5
47 REM
48 DATA"FOR","IF","GOTO","POKE"
49 REM -----
50 REM      WITH SHIFT KEY PRESSED
```

## Define Keys

This is a very useful routine for the 64 which allows you to set the four function keys on the right of the keyboard to display complete words. A few months ago we published a routine to do this but we have decided that this program is so good that it must be printed.

There is a maximum of 8 characters allowed to be set to each key but the difference to the other routine is that the other routine only allowed shifted and unshifted function keys allowing only eight functions. With this routine, you still get the shifted and unshifted keys but in addition you can use the commodore key for another four functions and the control key for yet another four. This gives a total of 16 defined function keys.

The problem is set up with the machine code source in rem\$ so that anybody wishing to understand the operation of this routine or even to get a few tips on 6502 programming may do so.

# BASIC PROGRAMMING

```
51 REM F8 F2 F4 F6
52 REM
53 DATA"NEXT", "THEN", "GOSUB", "PEEK()"
54 REM -----
55 REM WITH COMMODORE KEY PRESSED
56 REM F7 F1 F3 F5
57 REM
58 DATA"STR$()", "LEFT$()", "MID$()", "RIGHT$()"
59 REM -----
60 REM WITH C.T.R.L KEY PRESSED
61 REM F7 F1 F3 F5
62 REM
63 DATA"LIST", "LOAD", "SAVE", "RUN←"
64 REM -----
65 REM BY CHANGING DATA IN LINES
66 REM
67 REM 48,53,58,63 FUNCTION KEYS CAN
68 REM BE ALTERED TO YOUR OWN CHOICE.
69 REM
70 REM
71 REM BY PLACING A LEFT ARROW (←)
72 REM
73 REM AFTER THE COMMAND IT WILL
74 REM
75 REM AUTOMATICALLY RETURN ITSELF.
76 REM
77 REM E.G. RUN← WHEN PRESSED WILL
78 REM
79 REM AUTOMATICALLY RUN WITHOUT YOU
80 REM
81 REM HAVING TO PRESS RETURN.
82 REM ****
83 REM *
84 REM * PROGRAM EXPLANATION *
85 REM *
86 REM ****
87 REM THIS PROGRAM WORKS BY TAKING HEX
88 REM POKING INTO MEMORY AT 38600 UP.
89 REM THIS DATA FORMS A MACHINE CODE
90 REM SYS38600.
91 REM HITTING RUN/STOP & RESTORE KEYS
92 REM SYS38600 WILL TURN THE ROUTINE
93 REM THE COMMANDS ARE HELD AS DATA IN
94 REM THESE COMMANDS ARE COPIED INTO
95 REM CAN BE USED B THE MACHINE CODE
96 REM THE MACHINE CODE LOOKS LIKE THIS.
97 REM 96C8 SEI TURNOFF IRQ.
98 REM 96C9 LDA #$DC (SET UP
99 REM 96CB STA $0314 (ADDRESS
100 REM 96CE LDA #$90 (FOR NEW
101 REM 96D0 STA $0315 (IRQ JUMP.
102 REM 96D3 CLI TURNON IRQ.
103 REM 96D4 STA $38 (LOWER TOP OF
104 REM 96D6 LDA #$00 (MEMORY TO
105 REM 96D8 STA $37 (PROTECT PROG.
106 REM 96DA RTS BASIC RETURN.
107 REM 96DB NOP NO OPERATION.
108 REM 96DC NOP START NEW IRQ.
109 REM 96DD PHA (SAVE ALL
110 REM 96DE TXA (REGISTERS
111 REM 96DF PHA (BY PUSHING
```

DATA, CONVERTING INTO DECIMAL &  
ROUTINE WHICH IS CALLED BY  
TURNS OFF THE ROUTINE.  
BACK ON AGAIN.  
LINES 48-63.  
MEMORY AT 38400 UP, WHERE THEY  
ROUTINE.

# BASIC PROGRAMMING

112 REM 96E0 TYA	(ONTO THE STACK	142 REM 9711 INX	(IF F1 (Y=\$04)
113 REM 96E1 PHA	(-----	143 REM 9712 INX	(THEN X=X+\$08
114 REM 96E2 LDA #\$05	(GET LAST KEY	144 REM 9713 INX	(
115 REM 96E4 CMP #FB	(PRESSED)	145 REM 9714 INX	(IF F3 (Y=\$05)
116 REM 96E6 BEQ \$9736	(IF NONE THEN	146 REM 9715 INX	(THEN X=X+\$10
117 REM 96E8 STA #FB	(BRANCH \$9736	147 REM 9716 INX	(
118 REM 96EA NOP	NO OPERATION.	148 REM 9717 INX	(IF F5 (Y=\$06)
119 REM 96EB LDX #\$00	SET X TO 00	149 REM 9718 INX	(THEN X=X+\$18
120 REM 96ED LDA \$028D	(CHECK IF SHIFT	150 REM 9719 CPY #\$07	(
121 REM 96F0 TAY	(OR COMMODORE	151 REM 971B BNE \$970A	(
122 REM 96F1 CPY #\$00	(OR CTRL KEY	152 REM 971D JMP \$9736	(-----
123 REM 96F3 BEQ \$96FE	(PRESSED)	153 REM 9720 NOP	(PUT X IN LOW
124 REM 96F5 TXA	(IF SHIFT X=\$20	154 REM 9721 TXA	(BYTE & \$96 IN
125 REM 96F6 CLC	(IF COMM X=\$40	155 REM 9722 STA \$FC	(HIGH BYTE FOR
126 REM 96F7 ADC #\$20	(IF CTRL X=\$80	156 REM 9724 LDA #\$96	(DATA POINTER.
127 REM 96F9 TAX	(	157 REM 9726 STA \$FD	(-----
128 REM 96FA DEY	(	158 REM 9728 LDY #\$00	(READ DATA
129 REM 96FB CLC	(	159 REM 972A LDA (\$FC),Y	(INTO KEY-
130 REM 96FC BCC \$96F1	(-----	160 REM 972C STA \$0277,Y	(BOARD BUFFER
131 REM 96FE CPX #\$60	(IF X=\$60	161 REM 972F INY	(FOR PRINTING
132 REM 9700 BMI \$9704	(THEN X=\$60	162 REM 9730 CPY #\$08	(
133 REM 9702 LDY #\$60	(-----	163 REM 9732 BNE \$972A	(
134 REM 9704 NOP	NO OPERATION	164 REM 9734 STY \$06	(-----
135 REM 9705 NOP	NO OPERATION	165 REM 9736 PLA	(GET Y,X & A
136 REM 9706 LDA #\$05	(GET LAST KEY	166 REM 9737 TAY	(REGISTER FROM
137 REM 9708 LDY #\$03	(PRESSED)	167 REM 9738 PLA	(ORIG VALUES ON
138 REM 970A STY \$FE	(	168 REM 9739 TAX	(THE STACK.
139 REM 970C CMP #FE	(IF F7 (Y=\$03)	169 REM 973A PLA	(-----
140 REM 970E BEQ \$9721	(THEN X=X+\$00	170 REM 973B JMP \$EA31	JUMP TO NORMAL
141 REM 9710 INY	(	171 REM 973E BRK	IRQ ROUTINE
			READY.

READY.

```

0 GOSUB1300
1 REM*****ROAD FROG*****
2 0=20
3 L=1
4 MN=3:TI$="000000":W$="120"
5 FORA=1TO5:P$(A)="":NEXTA
10 A(1)=1:A(2)=4:A(3)=4:A(4)=8
15 S1=33748
20 PRINT"3"
30 FORA=1TO20
40 A$=A$+"  _ "
50 B$=B$+" _ "
55 REM
56 REM*****CAR GRAPHICS*****
57 REM
60 C$=C$+" **":D$=D$+" **"
64 REM
65 REM***SAFE ZONE ***
67 REM
70 NEXTA
80 PRINT"TIME=";W$;"ROAD FROG";"SC
81 PRINT" "P$(1)" "P$(2)" "P$(3)" "P$(4)" "P$(5)";
82 PRINT" ";;
83 PRINT"
85 IFVAL(TI$)>119THEN900
86 REM***OUT OF TIME***
87 REM***PRINT CHARACTERS***
```

## Road Frog

Written for the PET 40 column machines, the object of this game is to get the frog (spade symbol) across the road without getting run over and move it into one of the five 'homes' at the top of the screen. You can not move into a home that already has a frog in it, and when all five homes are full, the game starts again. You score ten points for each frog home and there is a time limit of 120 seconds to get each frog home.

This game was written by Simon Goodyear.

# BASIC PROGRAMMING

```
88 REM
90 PRINTMID$(A$, A(1), 39): PRINTMID$(B$, A(1), 39): PRINT: PRINT
95 PRINTMID$(A$, A(2), 39)
100 PRINTMID$(B$, A(2), 39): PRINT: PRINT: PRINTLEFT$(C$, 39): PRINTLEFT$(D$, 39)
105 PRINT: PRINT
110 PRINTMID$(A$, A(3), 39): PRINTMID$(B$, A(3), 39): PRINT: PRINT
115 PRINTMID$(A$, A(4), 39)
120 PRINTMID$(B$, A(4), 39)
125 REM
126 REM***MOVE CHARACTERS***REM
127 REM
130 A(1)=A(1)+L: IF A(1)>8 THEN A(1)=1
140 A(2)=A(2)-L: IF A(2)<1 THEN A(2)=8
150 A(3)=A(3)+L: IF A(3)>8 THEN A(3)=1
160 A(4)=A(4)-L: IF A(4)<1 THEN A(4)=8
170 IF G$<>"" THEN M$=G$
171 N=120-VAL(T1$): W$=RIGHT$(" "+STR$(N), 3): REM***COUNT-DOWN***REM
180 GETG$
181 S2=S1
182 REM
183 REM***CURSOR CONTROLS***REM
184 REM
185 IF G$="" THEN G$=X$
190 IF G$="Z" AND S1>32727 AND D>1 THEN S1=S1-2: D=0-2
200 IF G$="X" AND S1<33766 AND D<38 THEN S1=S1+2: D=0+2
210 IF G$=" " AND S1>32800 THEN S1=S1-80
220 IF G$=" " AND S1<33727 THEN S1=S1+80
225 X=S1+40: U=PEEK(X): P=PEEK(S1)
232 IF S1<32806 THEN IF U=990 RU=65 THEN 500
235 IF PEEK(S1)<32 AND PEEK(S1)<73 AND PEEK(S1)<85 AND PEEK(S1)<65 THEN 550
237 POKE S2, 32
240 POKE S1, 65
250 GOTO 80
300 G$="" : X$="" : D=20: S1=33748
305 REM
306 REM***HOLEs FULL***REM
310 FOR A=1 TO 5: IF P$(A)="" THEN 380
320 NEXT A: GOTO 800
400 REM
405 REM***HOME ?***REM
406 REM
500 IF S1<32779 AND P$(1)="" THEN P$(1)="#" : GOSUB 1200: GOTO 380
510 IF S1<32786 AND S1>32779 AND P$(2)="" THEN P$(2)="#" : GOSUB 1200: GOTO 380
520 IF S1<32793 AND S1>32786 AND P$(3)="" THEN P$(3)="#" : GOSUB 1200: GOTO 380
530 IF S1<32800 AND S1>32793 AND P$(4)="" THEN P$(4)="#" : GOSUB 1200: GOTO 380
540 IF P$(5)="" AND S1>32800 THEN P$(5)="#" : GOSUB 1200: GOTO 380
541 GOTO 1000
545 REM
546 REM***HAVE YOU BEEN RUN OVER ?***REM
550 MN=MN-1: IF MN<1 THEN 700
560 G$="" : X$="" : D=20: S1=33748: T1$="000000": W$="120"
570 PRINT "YOU HAVE BEEN RUN OVER": FORT=1 TO 500: NEXT T: GOTO 800
700 PRINT "ALL YOUR MEN ARE DEAD! HARD LUCK": END
710 REM
720 REM***HAVE YOU RUN OUT OF TIME ?***REM
730 REM
800 FOR A=1 TO 5: P$(A)="" : NEXT : L=L+.4: T1$="000000": W$="120": S1=33748: D=20: GOTO 800
900 PRINT "YOU HAVE RUN OUT OF TIME": FORT=1 TO 500: NEXT T
905 REM
906 REM***FROG IN HOLE***REM
907 REM
910 MN=MN-1: IF MN<1 THEN 700
920 G$="" : X$="" : D=20: S1=33748: T1$="000000": W$="120": GOTO 800
1000 PRINT "FROG IN HOLE HARD LUCK !!": FORT=1 TO 1000: NEXT T
```

# BASIC PROGRAMMING

```

1010 G$="" : X$="" : O=20 : S1=33748 : TI$="0000000" : W$="120" : GOTO80
1199 END
1200 SC=SC+10 : TI$="0000000" : W$="120"
1210 RETURN
1299 END
1300 PRINT"J"
1305 REM
1306 REM*****INSTRUCTIONS*****
1307 REM
1310 PRINT"HI. I'M ROAD FROG."
1340 PRINT
1350 PRINT"WHAT'S YOUR NAME ?"
1355 INPUT R$
1356 PRINT"HELLO";R$/"LET ME TELL YOU ABOUT MYSELF."
1357 PRINT"KEY TO CONTINUE."
1359 GETG$: IFG$="" THEN1359
1360 PRINT"ALL YOU NEED TO DO IS CROSS THE ROAD WITHOUT GETTING KNOCKED OVE
R"
1365 PRINT"IT'S AS SIMPLE AS THAT !"
1366 PRINT"KEY TO CONTINUE."
1367 GETG$: IFG$="" THEN1367
1370 PRINT"WHERE ARE THE CURSOR CONTROLS?"
1380 PRINT
1390 PRINT"/ IS THE FROG"
1391 PRINT"/ IS LEFT MOVE"
1392 PRINT"/ IS RIGHT MOVE"
1393 PRINT"/ IS UP MOVE"
1394 PRINT"/ IS DOWN MOVE"
1395 PRINT
1396 PRINT"WHEN MOVING PRESS 'SPACE BAR' TO STOP":PRINT
1397 PRINT"YOU HAVE 3 LIVES. SO YOU NEED TO BE A QUICK GUN TO STAY ALIVE."
1398 PRINT"DON'T FORGET TO MOVE THROUGH THE BARRIER TO CROSS THE 2ND ROAD."
1400 PRINT
1410 PRINT"HAVE FUN !"
1420 PRINT"KEY TO START"
1430 GETG$: IFG$="" THEN1430
1440 RETURN
READY.

```

## Shuffle

This is the game for the VIC-20. The idea of the game is to rearrange the numbers in a four by four grid so that they read sequentially:

1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	

The numbers can only be moved into the space and the space goes to where the number was.

This game will work on the unexpanded VIC-20 and all other commodore machines as well.

```

130 GOSUB610
140 PO$="          1 2 3 4          5 6 7 8          9 10 11 12          13 14 15"
150 DIMA(16) : B(16) : TB=0 : POKE36879,25
160 PRINT"TAB(TB)" : TAB(1)=1 : TAB(2)=2 : TAB(3)=3 : TAB(4)=4 : TAB(5)=5 : TAB(6)=6 : TAB(7)=7 : TAB(8)=8 : TAB(9)=9 : TAB(10)=10 : TAB(11)=11 : TAB(12)=12 : TAB(13)=13 : TAB(14)=14 : TAB(15)=15 : TAB(16)=16
170 FORI=1TO4:FORJ=1TO3:PRINTTAB(TB);" " : TAB(1)=1 : TAB(2)=2 : TAB(3)=3 : TAB(4)=4 : TAB(5)=5 : TAB(6)=6 : TAB(7)=7 : TAB(8)=8 : TAB(9)=9 : TAB(10)=10 : TAB(11)=11 : TAB(12)=12 : TAB(13)=13 : TAB(14)=14 : TAB(15)=15 : TAB(16)=16
180 IFI<4THENPRINTTAB(TB);" " : TAB(1)=1 : TAB(2)=2 : TAB(3)=3 : TAB(4)=4 : TAB(5)=5 : TAB(6)=6 : TAB(7)=7 : TAB(8)=8 : TAB(9)=9 : TAB(10)=10 : TAB(11)=11 : TAB(12)=12 : TAB(13)=13 : TAB(14)=14 : TAB(15)=15 : TAB(16)=16
190 NEXTI:PRINTTAB(TB);" " : TAB(1)=1 : TAB(2)=2 : TAB(3)=3 : TAB(4)=4 : TAB(5)=5 : TAB(6)=6 : TAB(7)=7 : TAB(8)=8 : TAB(9)=9 : TAB(10)=10 : TAB(11)=11 : TAB(12)=12 : TAB(13)=13 : TAB(14)=14 : TAB(15)=15 : TAB(16)=16
200 PRINT" " : TAB(1)=1 : TAB(2)=2 : TAB(3)=3 : TAB(4)=4 : TAB(5)=5 : TAB(6)=6 : TAB(7)=7 : TAB(8)=8 : TAB(9)=9 : TAB(10)=10 : TAB(11)=11 : TAB(12)=12 : TAB(13)=13 : TAB(14)=14 : TAB(15)=15 : TAB(16)=16
210 FORI=1TO16:R(I)=I:NEXTI
220 FORI=1ST02STEP-1:J=RND(1)*I+1:T=R(J):A(J)=R(I):R(I)=T:NEXTI
230 FORI=1TO16:B(I)=A(I):IFB(I)=16THENBS=I
240 NEXTI
250 C=0:FORI=1TO16
260 IF A(I)<0 THEN T=R(I):A(I)=R(T):R(T)=T:C=C+1:GOTO260
270 NEXTI
280 IF (CAND1)=0 THEN S20
290 I=INT(RND(1)*16)+1:IFB(I)=16 THEN S20
300 J=INT(RND(1)*16)+1:IFB(J)=16 OR I=J THEN S20

```

# BASIC PROGRAMMING

```

310 T=B(I):B(I)=B(J):B(J)=T
320 PRINT"@";PRINT"@@@"
330 FOR I=1 TO 16 STEP 4:FOR J=0 TO 3:PRINT TAB(TB+J*5+2)
340 IF B(I+J)<16 THEN PRINT" " RIGHT$(STR$(B(I+J)),2)
350 NEXT J:N=0:PRINT"@@@":NEXT I:PRINT LEFT$(P0$,22)/N;"MOVES"
360 GET Z$: IF Z$="" THEN 360
370 IF Z$="S" THEN 360
380 IF Z$<"2" OR Z$>"8" THEN 360
390 IF VAL(Z$)=1 THEN 360
400 ON VAL(Z$)/2 GOTO 470,450,430,410
410 T=BS+4: IF T>16 THEN 360
420 GOTO 480
430 T=BS-1: IF (3 AND T)=0 THEN 360
440 GOTO 480
450 T=BS+1: IF (3 AND BS)=0 THEN 360
460 GOTO 480
470 T=BS-4: IF T<1 THEN 360
480 B(BS)=B(T):B(T)=16
490 I=INT((BS-1)/4):J=BS-I*4
500 PRINT"@@@LEFT$(P0$, I*4+5):PRINT"@@@TAB(TB+J*5-3)RIGHT$(STR$(B(BS)),2)
510 I=INT((T-1)/4):J=T-I*4
520 PRINT" @@LEFT$(P0$, I*4+5):PRINT" @@TAB(TB+J*5-3) "
530 BS=T:N=N+1:PRINT"@@@LEFT$(P0$,22)/STR$(N); " MOVE": IF N>1 THEN PRINT"S
540 PRINT" " : IF BS<16 THEN 360
550 FOR I=1 TO 16: IF B(I)<0 THEN 360
560 NEXT I:PRINT"@@@LEFT$(P0$,20); " CONGRATULATIONS":PRINT"@@@N"MOVES"
570 PRINT"@@@ANOTHER GO ?"
580 GET I$: IF I$="" THEN 580
590 IF I$="Y" THEN RUN
600 POKE 36879,27:PRINT"@@@":END
610 POKE 36879,42:POKE 36869,240
620 PRINT"***** VIC SHUFFLE *****"
630 PRINT"@@@YOU HAVE TOO REARRANGE
640 PRINT" THE NUMBERS IN THEIR
650 PRINT" BOXES SO THAT THEY
660 PRINT" ARE IN CORRECT ORDER
670 PRINT"@@@THE CORRECT ORDER IS:
680 PRINT" 1 2 3 4
690 PRINT" 5 6 7 8.
700 PRINT" 9 10 11 12
710 PRINT" 13 14 15
720 PRINT"@@@YOU CAN ONLY MOVE THE
730 PRINT" NUMBERS INTO SPACES
740 PRINT" LEFT BY OTHER NUMBERS
750 PRINT" USE THE KEYS AS SHOWN
760 PRINT" FOR THE DIRECTIONS.
770 PRINT"@@@GOOD LUCK
775 PRINT"@@@KEY TO BEGIN";
780 GET A$: IF A$="" THEN 780
790 PRINT"@@@":POKE 36869,240:RETURN
READY.

```

```

10 REM FIND THE WORD
20 REM ****
30 REM
40 S=1
50 P=0:POKE 36879,42
60 T$="ABCDEFGHIJKLMNPQRSTUVWXYZ"
70 DIM R$(8,8)
80 PRINT"***** FIND THE WORD ***"
90 PRINT" DO YOU WANT           INSTRUCTIONS ?"
100 GET A$: IF A$="" THEN 100
110 IF A$="Y" THEN GOSUB 1560
120 P=0:GOSUB 220

```

## Find The Word

The last program this month is also a game written for the unexpanded VIC-20. It will also, however, work on any other Commodore machine as well. The game is a type of word search where there is only one word in the grid and you are allowed to choose the size of the word. As the game goes on, after a wrong guess, the computer will give you clues as to the word with consecutive letters in the word.

This can be modified with your own words if you so wish.

# BASIC PROGRAMMING

```
130 GOSUB370
140 GOSUB450
150 GOSUB850
160 GOSUB950
170 IFO=0THEN GOTO150
180 GOSUB1310
190 IFO=0THEN GOTO1430
200 GOSUB1260
210 GOTO120
220 PRINT
230 PRINT"SHOW HARD DO YOU WANT"
240 PRINT"NOT TO BE ? (1/2)"
250 GETA$:IFA$=""THEN250
260 M=VAL(A$)
270 IFM<1THEN GOTO220
280 IFM>2THEN GOTO220
290 PRINT
300 PRINT"SHOW LONG IS THE WORD"
310 PRINT"LENGTH ? (3 TO 6)"
320 GETR$:IFR$=""THEN320
330 L=VAL(R$):IFL<3THEN290
340 IFL>6THEN290
350 N=L+1
360 RETURN
370 RESTORE
380 READA$
390 IFLEN(A$)<LTHEN GOTO380
400 Q=RND(7)*15+1
410 FORX=1TOQ
420 READW$
430 NEXTX
440 RETURN
450 X=0
460 R=INT(RND(1)*N+1)
470 K=INT(RND(1)*N+1)
480 IFR<=20RR=N-1THEN GOTO520
490 IFK<=20RK=N-1THEN GOTO520
500 X=X+1
510 GOTO460
520 FORX=1TON
530 FORY=1TON
540 Q=INT(RND(1)*26+1)
550 Q$=MID$(T$,Q,1)
560 R$(X,Y)=Q$
570 NEXTY
580 NEXTX
590 IFM=2THEN GOTO750
600 IFR<=20RR=N-1THEN GOTO680
610 IFK<=2THEN KR=1
620 IFK>N-1THEN KR=-1
630 FORX=1TOLEN(W$)
640 R$(K,R)=MID$(W$,X,1)
650 K=K+KR
660 NEXTX
670 RETURN
680 IFR<=2THEN RR=1
690 IFR>N-1THEN RR=-1
700 FORX=1TOLEN(W$)
710 R$(K,R)=MID$(W$,X,1)
720 R=R+RR
730 NEXTX
740 RETURN
750 IFR<=2THEN RR=1
760 IFR>N-1THEN RR=-1
770 IFK<=2THEN KR=1
780 IFK>N-1THEN KR=-1
790 FORX=1TOLEN(W$)
800 R$(K,R)=MID$(W$,X,1)
810 K=K+KR
820 R=R+RR
830 NEXTX
840 RETURN
850 PRINT"===="
860 FORX=1TON:PRINT" ";
870 FORY=1TON
880 PRINTR$(X,Y); " ";
890 NEXTY
900 PRINT
910 NEXTX
920 PRINT"=====";
930 PRINT"LENGTH=";L
940 RETURN
950 PRINT"WHAT IS THE WORD ?"
960 INPUTA$
970 P=P+1
980 IFA$=W$THEN GOTO01180
```

# BASIC PROGRAMMING

```
990 PRINT"SORRY IT'S WRONG"
1000 IF(P-2)=LTHEN GOTO1120
1010 IFFP>2THEN GOTO1050
1020 PRINT"NOT VERY GOOD"
1030 O=0:FOR KK=1 TO3000:NEXT
1040 RETURN
1050 H$=LEFT$(W$,P-2)
1060 PRINT"YOU NEED HELP."
1070 IFFP>3THEN1100
1080 PRINT"THE FIRST LETTER IS":PRINT H$
1090 GOTO1030
1100 PRINT"THE FIRST":P-2;"LETTERS":PRINT"ARE ";H$
1110 GOTO1030
1120 PRINT"WRONG, YOU DID":PRINT"NOT GET THE WORD"
1130 PRINT"RIGHT."
1140 PRINT"IT WAS ";W$"
1150 FOR I=1 TO3000:NEXT
1160 O=-1
1170 RETURN
1180 PRINT
1190 PRINT"WHAT IS IT"
1200 PRINT"YOU GOT IT IN"P
1210 PRINT"TRY"
1220 IFFP>1THEN PRINT"TRIES"
1230 FOR I=1 TO3000:NEXT
1240 O=1
1250 RETURN
1260 S=S+1
1270 RR=0
1280 KR=0
1290 P=0
1300 RETURN
1310 PRINT
1320 T=T+(L/P)*(L/P)*M
1330 PRINT"THE SCORE FOR THIS":PRINT"WORD":;INT((L/P)*(L/P)*M)
1340 PRINT"MAXIMUM SCORE":PRINT"Was";INT(L*L*M);";ID"
1350 PRINT"TOTAL SCORE";INT(T/S)
1360 PRINT"ANOTHER GO ?"
1370 GETA$:IFA$=""THEN1370
1380 PRINT
1390 IFA$="Y"THEN120
1400 IFA$="N"THEN1430
1410 PRINT"Y OR N PLEASE IT"
1420 GOTO1370
1430 PRINT":POKE36879,27:END
1440 DATA333,TIN,GET,THE,SIT,CAT,DOG,ONE,TWO
1450 DATA SIX,TEN,FIT,BET,SET,BIG,BAD
1460 DATA4444,FOUR,FIVE,COOL,MAKE,HOLE,POSH
1470 DATA NINE,CLAP,COLD,GOOD,YOUR,WHAT,READ
1480 DATA VAST,LAMP,DEUL
1490 DATA55555,CHIPS,GREAT,CLEAR,GLASS,MAKER
1500 DATA SPPOOL,SLEEP,BEAST,THREE,SEVEN,STOOL
1510 DATA EIGHT,PLANT,RADAR,RADIO,WATER
1520 DATA666666,ARCTIC,GUITAR,MINUTE,MIDDLE
1530 DATA PISTOL,ANIMAL,TOWERS,PERMIT,FIRING
1540 DATA DRAGON,ROBOTS,ROCKET,MOSAIC,MEMORY
1550 DATA BANDIT
1560 PRINT"INSTRUCTIONS:
1570 PRINT" FIND THE WORD IS A
1580 PRINT" GAME WHERE YOU HAVE
1590 PRINT" TO FIND A HIDDEN WORD
1600 PRINT" IN A GRID OF LETTERS
1610 PRINT" CLEAR ?
1620 GETA$:IFA$=""THEN1620
1630 RETURN
```

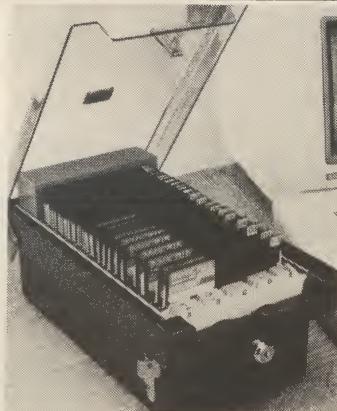
# Keeping track of floppy disks

Inmac have launched DiskMate which helps you to keep track of all your floppy disks as well as what is actually on them.

This floppy filing system can hold up to 80 5 1/4 inch floppy disks in a system designed for instant, accurate location of disks and easy retrieval.

The DiskMate comes with 20 word-processing cards and 20 data-processing cards to record information.

Each disk is held in place by suspension clips which clip on to the disk envelope and under



The DiskMate floppy filing system from Inmac.

the file retaining bar on each side of the DiskMate. A control switch will flip open the retaining bar and thus allow you to insert new disks in a matter of moments.

It is a dark brown moulded plastic box with a smoke grey hinged lid and a key. The cost is £37 although expansion packs with word-processing and data-processing cards and self-adhesive labels cost £11. There is a full one year guarantee with a 30 day risk free trial period.

Inmac have also come up with a range of workstations

which are supported by a welded steel frame and finished in oak or sapele laminate. There are three sizes available, 76cm deep and 110cm wide at £88, 76cm deep and 91cm wide at £79 and 61cm deep and 91cm wide at £76. There is also an optional shelf for £28 and, instead of the adjustable feet, a set of castors is available at £7.50. This is a self-assembly piece of furniture with tools supplied.

**Contact:** Inmac, Davy Road, Astmoor, Runcorn, Cheshire WA7 1PZ. Telephone: 09285 67551

# Six-Four software range

There is a whole range of new products previously not available in this country which are being marketed by The Six-Four Supplies Company.

Totl Text is a word processor for the tape or disk systems which includes pagination, margin control, justification, centred titles and up to four heading lines on each page. There is also the expanded character set for the VIC printer. The user can print either from memory or from input device. The price of this is £31 for tape or £34 for the disk version. Each price includes VAT.

Totl Label is a datafile program whose files can be used in conjunction with Totl Text and other word-processors. Its main application is for mail labels but it can be used for any unheaded file system that contains data that must be sorted, accessed and printed. There are 255 characters per record. The cost of this is £16 and £19 for tape and disk respectively including VAT.

Totl Time Manager enters data about activities, project categories, personnel, actual or proposed dates and times for start and completion. The

program prints bar charts in 54 optional formats. On tape or disk, the cost is £27 or £30 including VAT.

The Research Assistant lets the user enter and print out detailed source and reference information. The sort routine searches on the basis of up to 12 keywords from a sorted keyword cross reference list but you can only perform the edit operation on the disk version. The price is £27 and £30 for tape and disk respectively including VAT.

Music is one of the many great capabilities of the 64 and a new program called Note Pro II lets you control the pitch of each of the three voices using entries made on a treble clef screen display which allows you to input, examine and edit music on each screen.

The present facility in this program guides you through error-proof tone setting and a special machine language music play routine allows music speed potential of up to 450 notes per second. A four octave range is possible with variable tempo settings and a choice of legato or staccato for each note.

Note Pro Bridge is a machine language subroutine which may be copied freely and incorporated within any program. The retail prices for disk or tape are: Note Pro II £35, Note Pro Bridge £20 including VAT.

The PET Loader/Emulator is now available for the 64 and costs £15.50. This reconfigures the 64 memory regardless of any change to the ROM. Thus POKEs to the screen, to the program and other direct access operations work properly. This package will work with all PET software that does not use machine code.

The Recipe Box is for chefs as it is disk based database for the 64 costing £15. The menu program uses 17K of memory and sets up an ingredients file, recipe title/number file, ingredient numbers/quantities/units-of-measure file, recipe directions file and a category file. In normal use you have the options of adding to the ingredient file, printing that file out, entering recipes, ingredients, measures and directions etc.

Upgrading Basic V2 to Basic V4 is now possible through a

cartridge port attachment called C64-Link, which permits you to use many of the existing Commodore printers and disk drives. The Basic V4 commands enable 64 users to run PET programs with much less modification than usual. C64-Link also provides a built-in monitor that is constantly available for relocating, adjusting or inspecting programmes in use. Built-in modem software allows the C64 to talk to other computers because any standard RS232 modem connected to the user port with the appropriate cable can be used.

Backup is a utility program for the 64 or the VIC. It allows the user to make back-up copies of cassette based programs in Basic and M/C. This works by bypassing the normal tape loading routines and a special program, File Clone, is used for duplicating sequential data files. Backup costs £15 including VAT and is sold subject to the condition that copies are made only for the purchaser's own use from the purchaser's own originals.

**Contact:** The Six-Four Supplies Company, PO Box 19, Whitstable, Kent CT5 1TJ.

## IBM emulators

Apple Computer's announcement of an add-on unit which will enable the Apple 2 to run software written for the IBM Personal Computer is expected to have consequences far beyond Apple and IBM.

Experts see it as another important step forward in the rationalisation of the computer industry. For one thing it emphasises the pre-eminence of IBM in the industry and is an indication that IBM will become yet more dominant in the future.

Apple's plug-in card effectively enables the Apple 2 to

emulate the IBM p.c. Commodore are expected to produce a similar add-on unit in the future.

The 64 was deliberately built with a large memory which gives it a great deal of flexibility. The Apple plug unit will cost \$2,000 but experts reckon that a similar unit for the 64 could be sold for between \$300 and \$400.

The CBM-64 was actually built and marketed with the Apple machines in mind and the two are similar in many respects. It is reckoned to be relatively easy to produce a plug-in card for the 64.

## Simple filing 64

'Simply File', previously available for the 40 and 80 column PET, is now available for the 64 and, according to the manufacturers, Simple Software Limited, it is even better.

'Simply File' is a disk based management system suitable for business and educational applications. It works with any single or dual Commodore disk drive. A single disk drive will hold upwards of 400 records depending on record size and programs used and a dual disk drive such as the 4040 allows about 550 full block records on a disk while the 8050 will hold about 1850 full block records with just the

single disk working.

The maximum record size is 254 characters and this does not include field titles. Field size does not have to be specified. 'Simply File' is written in machine code and is more than friendly with the word-processor called 'Simply Write' which has also graduated from the 40 and 80 column PET to the 64.

'Simply File' on the 64 costs £60 whilst 'Simply Write' for the 64 costs £35 on tape and £40 on disk.

**Contact:** Simple Software Limited, 15 Havelock Road, Brighton, Sussex. Telephone: 0273 504879.

## Soft spread

Supersoft have designed a new spreadsheet that follows in the footsteps of Busicalc. It is called Busicalc 2 and runs on the Commodore 64.

This new version of the original spreadsheet makes full use of the memory of the 64 and has 999 rows and 125 columns. Worksheets can have up to 2500 boxes of information and many of the functions are user-defined.

The program comes on

either disk or tape costing £69 and £71 respectively and the formatted output can be provided by a Commodore printer. Software has been included that allows the 64 to drive an Epsom printer from the user port.

**Contact:** Supersoft, Winchester House, Canning Road, Wealdstone, Harrow, Middlesex HA3 7SJ. Telephone: 01-861 1166.

## Justification for a new word processor

A fully counting keyboard and a word processor all in one is exactly what is provided by a product called Typecraft.

It shows an author or typesetter exactly how text will look when it is typeset and the text displayed constantly shows all the typographical information required by the compositor to produce perfectly fitting copy every time. The system may also be used as a word processor and a small business computer.

Text is composed on the standard keyboard and is then transmitted to the typesetter by a modem where it interfaces with Compugraphic or Linotype typesetting systems.

Additions and deletions in text are immediately counted and justification is performed immediately. The status line at

the bottom of the screen constantly displays the font name, measure, point size, width, horizontal and vertical counts, tab columns and typesetting commands.

The disk filing system allows for the creation of documents containing multiple chapters, each containing many pages. The terminal will hold a capacity of 15,000 characters per file and the number of lines displayed on the screen and characters per line is 18 and 117 respectively. Typecraft is based on Wordcraft and the results of this can be output on dot matrix and daisy wheel printers.

**Contact:** Typecraft (UK) Limited, Shirley Lodge, 470 London Road, Slough, Berkshire SL3 8QY. Telephone: 0753 49444.

## Hofacker enter the UK

Hofacker are a new name to the British computer industry but they are ready to establish themselves here with two hardware products for the Commodore 64.

The first of these is called Blitztext, a word-processor with more than 70 commands, incorporating the INCLUDE command which allows the handling of large files on up to four diskettes. This is a fully screen-oriented product with scrolling up, down, left and right as one of its main features. It is fully compatible with Commodore peripherals and works with many other makes of printers.

It has built-in software for electronic mail, networking and there is also a telecommunications mode. The program is available on disk and cassette.

Their second product of

interest to 64 users is Macrofire, an editor and assembler. There are three elements to this program: a fully screen-oriented editor with more than 70 commands; a very fast assembler with macro capability and, finally, a machine language monitor.

The assembly can be started from the editor and the manufacturers claim that the program has "practically everything the serious machine language programmer needs everyday."

Although they are established in Singapore, America and West Germany, Hofacker are still looking for distributors in the UK to penetrate the British market.

**Contact:** Hofacker, Elcomp Publishing Inc., 53 Redrock Lane, Pomona, California 91766, USA. Telephone: (USA) 714 623 8314.

# Spreading the good news

After some initial resistance the retail trade has welcomed computerisation with open arms. Perhaps the most complex job for a computer in retailing is the organisation of a newsagent's delivery round. We went to Bath to talk to Robin Hyatt of Huggler Newsbox who have developed a complete system for newsagents for use on Commodore machines.



In September of 1982, Newsbox took a newsagent's package over from a company that had gone into liquidation. They improved the package and then several newsagents were approached in the hope that they would be the 'guinea pigs' providing feed-back which would help further improvements to be made. In September of this year, Newsbox merged with Hugglers, a firm in Jersey. This was a fortuitous merger, because Hugglers are well known in the newsagency trade as they have been marketing a manual system for 30 years. Their experience of the newsagents business blended with Newsboxes knowledge of computers made an ideal combination. A sign of the current success of the Huggler Newsbox package is that people are now approaching them.

The system this package is replacing is a manual system and the Huggler book is the size of a couple of telephone directories. Isabel McGregor runs Bathwick Newsagents with her husband Bob.

It is a typical newsagent tucked away in a little side street crammed with toys, toffees, tobacco, and piles of magazines and newspapers. The only difference was that behind the lemon bon-bons was a complete set of Commodore hardware - the VDU, the printer with a till roll and the disk drive.

This system had replaced 4 huge volumes which were needed to cover their 786 customers, quite a large number to deal with. The major complaint of the manual system is that it takes so much time to do anything. If the price of a publication goes up one pence, someone has to go right through the four volumes altering the price on each customer's account, with the Huggler Newsbox system a single alteration will change the price throughout the system.

Similarly for the accounts which must be the biggest headache for newsagents, instead of taking a week or more going through each customers account adding the totals up, writing bills out and

addressing envelopes, this package can do it in 1½ hours. The greatest advantage of this package is the time it saves, although any free time is spent doing something else, but at least the boring repetitive tasks are eliminated and so are errors, which often result from this type of work. The traditional pink slip system has also been eliminated and this has not been well received by a lot of the customers who regard these slips as vital in the ritual of paying the paper bill!

When Newsbox first started they looked for two or three newsagents who would be willing to try out the system. At that time only enthusiastic people would have been willing to take a chance on an unknown type of system, but there were a few anxious to take chances. The feed-back these individuals provided was invaluable for Newsbox and with the ideas for improvements and additional features the package was soon ready for the market.

Now 150 sites around the country are

# APPLICATIONS

using the package and they have been approached from people in the U.S.A. and from Australia. Robin Hyatt found very little resistance to the idea of using a computer in his customers who saw it simply as a Business Tool. When Newsbox launched their newsagent package there were only about three other similar packages on the market, but now this has increased to about 25 although only one other uses Commodore machines. Hugger Newsbox have managed to maintain a market lead so far and with the merger with Hugger their hold on the market is probably fairly safe for a while.

The package runs on the Commodore 8000 series and the company can sell the whole system to a customer at a basic price of £3,250 excluding VAT. On the 8050 disk drive the package can manage 2000 accounts, but on the newer version; the 8250 it can handle 3000. At present the largest capacity needed by a customer is 2000 and the smallest has about 200 accounts. It can list up to 1000 publications, can deal with 100 rounds and 20 orders per customer.

The company consists of a three man sales team who can move around and demonstrate the system to potential customers and a support software team who look after the existing users. When installing the system, a two day training course is given and this is broken up so that questions can be asked after the user has used the system for a while. In fact the system is very user-friendly and designed to be used by people who know nothing about computers. Every conceivable option that may be needed in the newsagent's package is included and notice of any improvements of presentation and facilities is sent to all the existing users.

The program itself uses a menu system and has a built-in calendar so that it can tell which day of the week it is – rather than just the date. Very important since Sunday, for instance, is a very different day of the week for newspapers. Right through the system there are checks to make sure everything is working correctly and as safety back-up copies only take a few minutes, there is little chance of anyone losing all their information. Perhaps the most difficult part of the system is at the beginning when all the existing records have to be put onto file. It took the McGregors four months to put all their customers on file. The package comes with 450 of the most popular publication titles already on it.

The layout on the VDU is clear and information is centred to make sure it is portrayed clearer. There are eight options to choose from covering Rounds,

ALL PUBLICATIONS RECEIVED AS AT WEDNESDAY 4 MAY 83

PUBN NO.	TYPE	NAME	RECEIVED
2	D	SUN	36
3	D	DAILY EXPRESS	60
5	D	DAILY MAIL	48
7	D	MIRROR	36
9	D	STAR	24
11	D	DAILY TELEGRAPH	60
15	D	FINANCIAL TIMES	48
21	D	GUARDIAN	36
44	D	SPORTING CHRONICLE	24
45	D	SPORTING LIFE	24
49	D	THE TIMES	12
52	D	LOCAL DAILY NEWS	24
60	E	LOCAL EVENING PRESS	78
62	S	SUNDAY EXPRESS	3
63	S	NEWS OF THE WORLD	1
64	S	SUNDAY MIRROR	3
66	S	SUNDAY PEOPLE	3
68	S	SUNDAY TIMES	5
69	S	MAIL ON SUNDAY	3
70	S	SUNDAY TELEGRAPH	2
72	S	THE OBSERVER	2
92	W	SUNDAY POST	1
93	W	U.K. PRESS GAZETTE	1
100	W	LOVING	5
101	W	WOMAN	25
102	W	WOMAN'S OWN	25
103	W	WEEKEND	0
105	W	R. & F' BALL OUTLOOK	15
110	W	ANGLING TIMES	6
111	W	AUTOCAR	2
112	X	RADIO TIMES	10
113	X	T.V. TIMES	8
120	W	BUDDY	2
121	W	COUNTRY LIFE	2
122	W	NEWSAGENT	4
123	W	DALTONS WEEKLY	8
130	W	THE CHURCH TIMES	1
131	W	BOXING NEWS	3
132	W	FARMERS WEEKLY	1
133	W	HORSE & HOUND	1
134	W	MY WEEKLY	1
140	W	BEEZER	0
141	W	BUNTY	1
142	W	GROCER	1
144	W	MY GUY	0
145	W	WORLD'S FAIR	1
200	M	ANNABEL	3
210	M	BIKE	2
220	M	C.B. RADIO	2
230	M	CUSTOM CAR	3
240	M	COSMOPOLITAN	2
250	M	GOOD HOUSEKEEPING	1
260	M	HOME FREEZER DIGEST	2
270	M	MOTOR SPORT	2
300	M	WOMAN & HOME	5
310	M	WHICH COMPUTER	2

A record of the newspapers and magazines that the newsagent has received from his wholesale supplier is just as important as the record of what he's sent out. This printout shows the publications received in one day. Initials in the 'TYPE' column refer to frequency: D = daily, E = evening, S = Sunday, W = weekly, M = monthly and X refers to extras.

**Simplify all your work with numbers -**

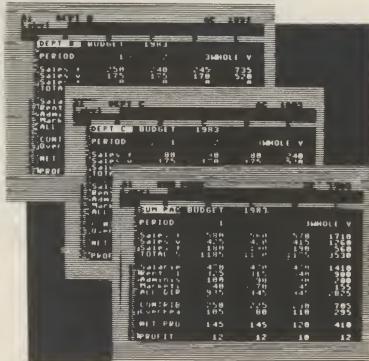
# Calc Result™

**The 3 dimensional  
program that's a hit with users  
all over the world!**

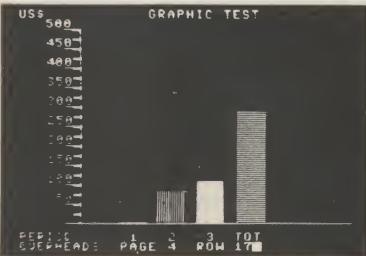
**Only CalcResult gives you all these  
exciting features . . .**

● **THREE DIMENSIONAL CALCULATION**

CalcResult's powerful three dimensional spread sheet format rapidly becomes an irreplaceable tool for those involved in figure manipulation and relationship. Budgets, reports, statements, forecasts and planning are all areas in which a saving in time and resources are as important as the ability to handle all forms of calculations. The many features of CalcResult simplify the rapid production and calculation of all aspects of business forecasting and planning. Each model can have up to 32 pages of associated information with a consolidated report and every page has 63 x 254 data positions which can contain text, formulas or values. CalcResult's powerful editing functions mean rapid creation and amendment of models and, once created, split screens and multiple page viewing allow easy review of information.



● **GRAPHIC REPRESENTATION**



CalcResult can translate rows of columns of numbers into histograms on the screen or printed histograms can be used to enhance presentation of tabular information in reports. (With CalcResult 64 full colour options are available on the screen.)

● **HELP FUNCTION AND AN EXPLICIT MANUAL**

CalcResult is simple to use and easy to learn thanks to a detailed instruction manual and help screens that are available at the touch of a button, to explain the functions available for each command.

● **FLEXIBLE PRINTING**

CalcResult allows you to define your own report layout. You can choose the order of columns to be printed and set the width of each independently. Layout definitions can be stored on a disk for future use.

● **TIME SAVING COMMANDS AND  
CONDITIONAL FUNCTIONS**

Commands like replicate, copy, move, go to, insert and delete make CalcResult simple and easy to use. CalcResult calculates according to correct mathematical priority and has standard functions for statistics, trigonometry and logarithms. Conditional functions like IF THEN ELSE and OR AND NOT allow greater flexibility in the setting up of models. Once created, all formulas are protected from accidental deletion.

**CalcResult is available for the  
business and home user . . .**

Advanced CalcResult, with the three dimensional capability, is available for the Commodore 700, 8000 and 64 computers—with a disk drive. A special home or small business version, Easy CalcResult 64, is available as a cartridge. Because this does not require a disk drive the three dimensional, graphic and help function features are not available but even so Easy CalcResult 64 is as powerful as the traditional spread sheets previously only available on expensive business micro computers.

PRICES: EASY CALCREST 64 £69 ADVANCED CALCREST 64 £109  
CALCREST 8000 £199 CALCREST 700 £225 ALL PRICES PLUS VAT

**CalcResult is only available from**

**KOBRA**

**MICRO MARKETING  
OR THEIR DEALERS**

Kobra Micro Marketing,  
P.O. Box 28,  
Henley-on-Thames, Oxon.  
Telephone  
(0491) 572512



**SEND IN THIS COUPON NOW FOR DETAILS**

To: Kobra Micro Marketing, P.O. Box 28, Henley-on-Thames, Oxon.

Please send details of the exciting CalcResult program. I am interested in:

CalcResult 700  CalcResult 8000   
CalcResult 64  Easy CalcResult 64

Name \_\_\_\_\_

Address \_\_\_\_\_

Tel. No. \_\_\_\_\_



# APPLICATIONS

## CUSTOMER DETAILS

(22) ALLISON  
THE ROBBINS

ROUND NO. : 3 2 3  
A/C PERIOD: SPECIAL

## CUSTOMER ORDER PUBLICATION

(21)	DELIVERY GUARDIAN	.15
(60)	LOCAL EVENING PRESS	0.23 1
(62)	SUNDAY EXPRESS	0.15 1
(63)	NEWS OF THE WORLD	0.28 1
(100)	LOVING	0.25 1
(110)	ANGLING TIMES	0.25 1
(101)	WOMAN	0.30 1
(102)	WOMANS OWN	0.24 1
(200)	ANNABEL	0.40 1
(210)	BIKE	0.80 1
(300)	WOMAN & HOME	0.55 1
(310)	WHICH COMPUTER	1.00 1

WEDNESDAY 4 MAY 83  
PRICE QTY DELIVERY

\*\*\*\* WEEKLY ORDER VALUE = 3.99 \*\*\*\* VALUE OF MONTHLIES = 2.75 \*\*\*\*

Above: Complete details of each customer's account are easily available.

----- DELIVERY REVENUE -----  
DELIVERY CHARGES A,B,C,D ARE 10 15 20 0 PENCE ON WEDNESDAY 4 MAY 83  
DELIVERY RATIO (M:E:S) = 1 : 1 : 1  
ROUNDS CHARGED BUT NOT DELIVERED

MORNING

EVENING

SUNDAY

MORNING ROUND NO

1

2

3

TOTAL FOR MORNING ROUNDS

EVENING ROUND NO

1

2

3

TOTAL FOR EVENING ROUNDS

SUNDAY ROUND NO

1

2

3

TOTAL FOR SUNDAY ROUNDS

TOTAL FOR ALL ROUNDS

## DELIVERY REVENUE £

0.64

0.71

0.63

1.98

## DELIVERY REVENUE £

0.35

0.21

0.00

0.56

## DELIVERY REVENUE £

0.34

0.16

0.41

0.91

3.45

Keeping a constant check on delivery revenues is another important function of the Newsbox system.

Accounts, Systems Reports and Shop Records.

All the options are to make things clearer and easier for the user and any information on customers, stocks, financial affairs and the rounds can be recalled very quickly. The Publications List can record up to 1000 titles and can list separately dailies, Sundays, weeklies and monthlies. Their current price and the standing order quantities are also listed. Print-outs can be obtained for each

customer taking a publication and the details are listed in order showing what each customer has ordered and the total number that is required for delivery and shop saves.

The example of a customer's details is shown here and lists the standing order, the relevant round number, the delivery charge and the total weekly and monthly order values. A customer directory enables the user to access into the account of any of his customers very

quickly.

With the manual system a customer going on holiday means time spent changing his account, the rounds etc, but with the list of holiday stops, the user can list them all and also record which publications need to be held for delivery on the customer's return. For publications such as *TV Times* which is needed a week in advance the publication is automatically stopped and restarted a week before. The standing order log lists all publica-

# **TRUST HUGGLER TO BRING YOU NEWSBOX KNOWHOW**

No one understands your business better than Huggler. After all, we invented the first newsagents' accounting system over 50 years ago.

So you can be sure that when we put our name to a computer accounting system, it's the best computer package in the business.

First we looked for the right partner. Then, after extensive trials, together we've developed the ideal software program, which combines our accounting knowhow with the computing skills and experience of Computanews.

Together, we offer you the most complete, easy to use accounting system ever designed for newsagents.

The new Huggler Newsbox. The system that takes the paperwork out of paper rounds.

So now you can get all the benefit of Huggler's understanding of your needs combined with the technological expertise of Computanews, working for you all round the clock.

Our new base in Bath allows us to look after you even better with on-the-spot computer consultancy and 24 hour service from our team of computer engineers.

Altogether the Huggler Newsbox is the best news ever for newsagents. Find out about it now.



## **HUGGLER NEWSBOX**

The accounting system that understands your problems.

Please send me the Huggler Newsbox Brochure

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Tel. No: \_\_\_\_\_

Post to Huggler Newsbox, 9/11 Walcot Street, Bath, BA1 5BN, England or phone Dianne Young, Bath (0225) 60541.

# APPLICATIONS

tions relevant to the day of printing and enables the user to record the publications received and check them with the wholesaler's invoice. The changes in standing order deliveries on rounds can also be shown.

Another useful printout is a list of the publications that have been received each week and from this the newsagent has an idea of how many publications he must order for the next week. An example of a list of publications is shown here. If the price of a publication changes the previous two price changes are also kept on record enabling any customer queries on bills to be checked. Previous delivery dates are recorded so if a customer is worried that he hasn't received his publication it can be checked.

Delivery rounds must be one of the most important aspects of a newsagents business and this system has ironed out a lot of the associated problems. It provides a clear print-out for each round usually one in the morning and another in the evening. All irrelevant information is eliminated and holiday stops and the relevant publication holds are highlighted, as can be seen in the example of the rounds list. Publications for the round are listed to help the rounds person pack the correct number of each. The customer delivery sequences can be checked and a

print-out produced for each individual round.

The delivery charges for each round are divided between the customers and then added onto the customers account. Revenue obtained from delivery can be checked at any time and comes in the same form as the example of a delivery revenue print-out.

Accounts present the main problem to the newsagent, but with this system everything is co-ordinated to make the accounting side much simpler and less time consuming. Customer receipts are printed weekly and any outstanding balances are shown. It is in the form of a ledger system for manual payments and there is a space for entry of "Paid up to" date as can be seen from the example of a customers receipt. There is also a point of sale option and individual payments are made easier. This function is the subject of much interest from customers of the Bathwick Newsagents. One 90 year old lady finds the whole concept absolutely wonderful and thoroughly enjoys seeing her name on the screen and receiving 'computerised' invoices.

However this view is not shared by every one. Isabel said that it was the younger and middle-aged customers that were suspicious of this new system rather than the older generation. When a

customer comes in to pay, the VDU shows customer details, the amount paid and any balance outstanding. The receipt is produced on till-roll style stationery.

Customer invoices can be printed in the morning round to facilitate easy delivery and on it four lines of sales message or selective reminders for debtors can be printed as in the example of a customer invoice. For the debtors, a breed common to all businesses, there is an option available for listing all customers and showing a breakdown of their debt.

Robin Hyatt listed what he thought were the main advantages of the system – it saves time, provides better cash flow information, less errors occur and so less complaints are received and there is more accuracy with the accounts and stocks. Generally an overall improved efficiency. Isabel McGregor backed this up saying that it had proved itself many times over. Her husband, Bob had been thinking about installing the system for a while and had finally taken the plunge, investing in the system in July of this year. She was obviously thrilled with it and apart from a few teething problems at the beginning they had had no problems at all, apart from the occasional distrustful customer!

**Contact:** Huggler Newsbox, 9 Walcot Street, Bath, Avon BA1 5BN. Tel: 0225 60541. Cost £3,520.

*Below: The system can also provide receipts for all the newsagent's customers.*

## CUSTOMER RECEIPT/S AS AT WEDNESDAY 4 MAY 83

(22) ALLISON  
THE ROBBINS

WEEKLY ORDER VALUE =	3.99	*	*
VALUE OF MONTHLIES =	2.75	*	*
1 (S) O/S AT 4 /5 /83 =	14.52	*****	*****

AMOUNT PAID  
\*\*\*\*\*

ALLISON \* 22  
\*\*\*\*\*  
\* PAID UP TO \* \*  
\* \* \* \* \*  
\*\*\*\*\*

(1) ATKINSON  
1 PARK LANE

WEEKLY ORDER VALUE =	3.81	*	*
VALUE OF MONTHLIES =	0.00	*	*
1 (S) O/S AT 4 /5 /83 =	12.47	*****	*****

AMOUNT PAID  
\*\*\*\*\*

ATKINSON \* 1  
\*\*\*\*\*  
\* PAID UP TO \* \*  
\* \* \* \* \*  
\*\*\*\*\*

(4) BLEASDALE  
4 PARK LANE

WEEKLY ORDER VALUE =	2.23	*	*
VALUE OF MONTHLIES =	0.65	*	*
2 (M) O/S AT 4 /5 /83 =	10.81	*****	*****

AMOUNT PAID  
\*\*\*\*\*

BLEASDALE \* 4  
\*\*\*\*\*  
\* PAID UP TO \* \*  
\* \* \* \* \*  
\*\*\*\*\*

(17) DANIELL  
3 FAIRWAY

WEEKLY ORDER VALUE =	0.38	*	*
VALUE OF MONTHLIES =	0.00	*	*
2 (M) O/S AT 4 /5 /83 =	1.58	*****	*****

AMOUNT PAID  
\*\*\*\*\*

DANIELL \* 17  
\*\*\*\*\*  
\* PAID UP TO \* \*  
\* \* \* \* \*  
\*\*\*\*\*

# Accounting for business

The software available for Commodore machines is proliferating so much that businessmen and women are faced with a bewildering choice. We take a look at one of the latest packages from Studio Software.

One of the major areas of concern to small businesses is computer control. Should they continue with the older manual system of business accountancy which is generally becoming outdated? Considering the relatively small amount of capital generated by the business, will the initial heavy financial outlay for hardware and software represent a considerable saving in time and money in the long run? Or will the investment actually turn out to be money down the drain?

These are all questions which the average businessman finds very perplexing and there are no hard and fast answers to any of them. However, part of the answer can be found merely by looking at products, just as a first time house buyer looks at a house with no intention of buying. There are many software companies who are producing business packages to order or packages that can simply be bought 'off the peg'. One such company is Studio Software with a suite of programs called BusCom.

These programs are all either tape or a disk and they can be used on the VIC or the 64 along with printer and cassette deck or

disk drive. Like all other such software packages, the aim of the suite is to give the small business an accounting system that will produce clear and accurate records that can be sent to an accountant for the final accounts to be prepared. There are four different sets of accounts rather unimaginatively called BusCom 1, 2, 3 and 4 and these are currently all available on separate forms of media. Whilst the merits of this are clear to users who wish to buy one program separate from the other constituents of the suite, there is undoubtedly a strong case to put all the programs on to a single disk, thus producing a more compact appearance and saving the user reloading time every time they want to switch from stock accounts to retail accounts.

Rather a more serious criticism is that the system is not a little more user-friendly. An example of this can be seen on the first screen of BusCom 1 which deals with the monthly accounts. This screen comes up with the user prompt 'enter date' which works fine if the correct data is entered. However, if illegal data is

entered, one normally expects a message to appear on screen telling you as much. Alas not so. In this case the program hangs up resulting in a very blank screen.

One redeeming fact is that Studio Software do provide demonstration programs. These will cost the potential user but they can be obtained on the understanding of a refund if the demonstration packs are returned or the cost can be taken off the purchase price of the program should the user decide to buy the system. Whether on disk or cassette, all the user has to do with the demonstration pack is LOAD, RUN, relax and watch.

As stated previously, BusCom 1 is all about monthly accounts and is intended largely for businesses paying by and being paid by cheques and is available in two versions, one of which includes VAT. This part of the system is divided into three main areas, each of which are menu-selectable. The sales account allows the user to enter cash or cheque receipts into one of three columns. These receipts may then be recorded against the name of the buyer and the total of the sale

TAKINGS		ANALYSIS			BANKED			
		CASH	CHEQUES	GOODS A	GOODS B	GOODS C	CASH	CHEQUES
MONDAY	15.00	20.00		20.00	10.00	5.00	0.00	0.00
TUESDAY	30.00	40.00		40.00	20.00	10.00	25.00	45.00
W'SDAY	45.00	60.00		60.00	30.00	15.00	0.00	0.00
TH'SDAY	60.00	80.00		80.00	40.00	20.00	25.00	45.00
FRI'DAY	75.00	100.00		100.00	50.00	25.00	0.00	0.00
SAT'DAY	90.00	120.00		120.00	60.00	30.00	25.00	45.00
TOTAL	315.00	420.00		420.00	210.00	105.00	75.00	135.00
LESS BAD DEBTS		5.00		5.00				
TOTAL	315.00	415.00		415.00	210.00	105.00	75.00	135.00
TOTAL SALES	730.00		NET SALES =	634.78		VAT AT 15% =	95.21	
BALANCE AGREED								

# BUSINESS SOFTWARE

## BANK ACCOUNT FOR WEEK ENDING

DETAILS	PAID OUT	RECEIVED	BALANCE
OPENING BALANCE			240.25
CASH PAID IN			
	25.00		
	25.00		
	25.00		
			315.25
CHEQUES PAID IN			
	45.00		
	45.00		
	45.00		
			450.25
BAD DEBTS	5.00		
			445.25
123	120.00		
124	100.00		
125	33.56		
126	22.00		
			169.69
	0.00		
			169.69

*This sample of a bank account summary shows how Buscom presents information.*

entered into another column. For those who like to keep a weekly record of their income up to five weekly sections can be totalled to arrive at the monthly sales figures. Purchases keep a record of all products and materials bought in by the business. These purchases can then be analysed and entered into 10 user definable columns and thus you can enter records of payments for all overheads like lighting, heating, rates, telephone and extras like costs of transport. Wages can also be included as an overhead, but these are fully dealt within the BusCom 2 system. Bank accounts are obviously important to any firm and details of amounts paid in and out are kept in a screen designed to look like a bank statement which is clear and easy to understand.

There are many different ways and means of operating a wages system and Studio Software have come up with two wages programs, one for a weekly payroll and the other for a monthly payroll. Each of these are flexible enough to accommodate differences in basic pay, tax, overtime and other wage requirements. For instance, R U Rich may be on the same basic wage as I M Poor but the latter has done more overtime, pays less tax and comes out with more money.

Two tax tables are built-in to the system making PAYE pretty easy to

operate. The actual wages slip when it has been printed out will show basic pay, overtime and bonuses to total the gross pay. Also shown is the gross pay to date and all the deductions the employer has to make giving the net pay. Almost any number of copies can be printed out, so pay records can be kept for reference by the management as well as the employee. When the payroll has been completely entered, a printout can be obtained giving full details of pay and deductions for the period, informing the employer of the total amount due to the dreaded Inland Revenue for tax and insurance.

Since Statutory Sick Pay has become a legal necessity, there is also a routine on the wages programs that will cope with this. Changes in tax and insurance are becoming ever more frequent these days, and when these do occur it is necessary to send the programs back to Studio Software for updates for which the users will be charged.

The third package in the series is BusCom three, a menu-driven book-keeping system designed for use by ordinary business people. The options here are sales, purchases, bank account and cash account, although the first three are very similar in design and capability to the corresponding programs found in BusCom 1. However, there are some differences worth noting.

In sales, the gross and net sales as well as the VAT are all automatically calculated and displayed. There is a command in the purchases program which enables the user to produce totalled columns, VAT received and paid out and the difference due to the Customs and Excise. Operating the cash account is simplicity itself. Just enter in the opening balance and add or deduct as much as you need for payments. The program prints out the closing balance so that an accurate record is available at all times.

The final set of programs in this suite is provided via BusCom four, a stock check system. Using this program, up to 400 record cards may be kept at any one time in memory with more being stored on tape or disc. Each card is capable of accepting several entries relevant to the actual stock item. For instance there may be a description of the item, cost price, retail price, current level of stock to mention just a few. These stock records can be added to or deleted, listed and printed. Add to this the fact that these records may be sorted and found merely by specifying any one of the record entries and anyone can see that this program is very flexible. Of course, all the data can be stored on disc or cassette and programs can be amended to suit individual needs.

The cost of the software is £19.95 for the cassette versions and £21.95 for the disc versions. The address of Studio Software is Wootton Hall, Wootton Wawen, Warwickshire, telephone 05642 3467 or 0789 740588.

Loading any type of program into the micro from a cassette deck takes a notoriously long time, usually six or seven minutes. Quick Count have gone one step further than most other companies in this respect because their program, Book-keeping System for the Cash Trader, takes a total of 13 minutes to load. The program is also split into two sections, each section having to be loaded separately, the second section immediately after the first.

Despite these disadvantages, it is a very universal system (which it should be considering the cost - £89.75 including VAT!).

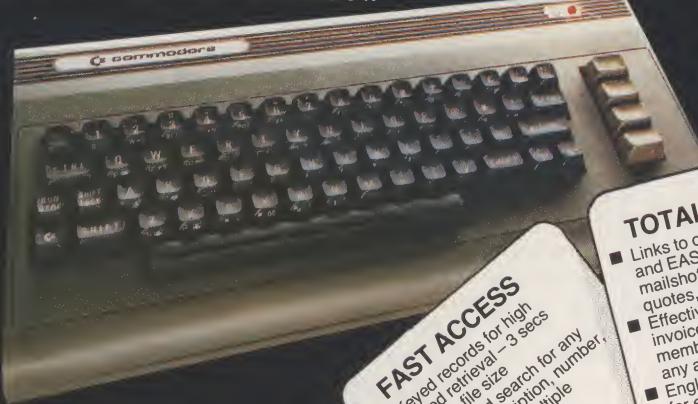
The whole system can be controlled by only a few keys: Return, up arrow, Y or N in replay to the prompts and C to continue. The up arrow serves a function similar to that of Return because it returns the user to the previous step. However, if it is used at the beginning of a procedure it means terminate. There are dangers when using this key in its former context, because you can step back too far and find yourself having to reload the whole program again, thus wasting another 13 minutes.

On loading the program, the initialising routine acts as a security device and also

# Strengthen your hand with *Superbase* 64

The complete information control system for the Commodore 64.

The World Famous Commodore 64.



Create your own formats, enter your records, change layouts and datafields.

Superbase gives you unrivalled control in home or office, business or professional practice, with a range of features including:

## YOUR OWN RECORDS

- Design your layout using text, numeric, calculated fields, linking and result, date, character size, key fields, record size, up to 1100 characters, up to 127 items spread over only by your equipment.
- Number of records can be thousands as you want, each with up to 15 files, learn fast through built-in HELP notes.

## FAST ACCESS

- Keyed records for high speed retrieval - 3 secs
- Select and search for any name, description, number, date, etc. in multiple combinations
- Sort records into any order
- Display selections or reports
- Generate printed or reports
- Browse through records matching on any criteria

## TOTAL CONTROL

- Links to other programs and EASY SCRIPT for mailshots, high-quality letters, quotes, tables, etc.
- Effective management of invoices, addresses, stock, membership, appointments - any and every kind of record
- English-like commands for easy conversational programming, plus built-in BASIC

## DATABASE MANAGEMENT

- Easy to understand menus
- Add or amend fields, or alter length - no file rebuilding needed
- Update files with automatic batch processing option
- Calendar arithmetic for effective time management
- Display quantities, values, totals, as you enter them.
- Formulas for on-screen result calculation



*Superbase* 64

Precision Software Limited,  
Park House, 4 Park Terrace,  
Worcester Park,  
SURREY KT4 7JZ ENGLAND.  
Telephone: 01-330 7166  
Telex: 8955021 PRECIS G



**C** commodore

# BUSINESS SOFTWARE

## PURCHASES & ANALYSIS FOR MAY 12TH 1983

NAME	CHQ	AMOUNT	TRADE GOODS	RENTS	PHONE	MOTOR	LABOR
T. JONES	123	12.50	12.50				
R. SMITH	124	120.00		120.00			
W. BROWN & CO	125	100.00			100.00		
S. GREEN	126	33.56				33.56	
WHITE BROS	127	22.00					22.00
G. ASPREY	128	50.00	K				

TOTALS =	338.06	12.50	120.00	100.00	33.56	22.00
----------	--------	-------	--------	--------	-------	-------

STHRY	REPRS	FXTRS	SNDRY	CAPTL	PRSNL
0.00	0.00	0.00	0.00	0.00	50.00
0.00	0.00	0.00	0.00	0.00	50.00

*Monthly summaries of financial information are essential to ensure good cash flow.*

sets the micro to produce output via a standard CBM printer. This can easily be reset to ASCII printers or a no printer option. It is rather difficult to see why this latter option has been included because most businessmen would prefer to present a print out to the Inland Revenue rather than a set of handwritten reports.

Setting up the system is actually done by selecting the utilities option on the initial menu. This only needs to be performed once and the first prompt 'enter date' proves that no illegal data can be entered - 39/07/83 will be met with the appropriate error message.

Many competitive systems that are disk based (and others that come on cassette) have the capacity to hold a vast range of accounts although you can of course store an almost unlimited amount of information on tape. There is a total of 79 nominal accounts, which allow the user to enter a description and change it almost at will. These accounts are split between accounts which relate to trading, profit and loss and the final balance sheet.

The actual name of the account is limited to 16 characters. The cancellation of any description is performed by hitting the 'n' key and at the bottom of the screen this very user-friendly system comes up with a message printed in red which will only stay on the screen for a few seconds before the user is returned to the original nominal account screen.

Changing periods is one area of this system which is probably just that little bit

below standard when compared with the high level standards set by the rest of the package. No less than three separate screens are needed to alter the week, quarter and year and in each case all the user needs to do is simply alter one date. It would be far easier and less time and space consuming if one screen catered for the complete range of period changes, even though a change in quarter and year does indicate a new week and that new year implies a new quarter.

In this system, all information is stored on cassette and, on dumping data files, there is a continual flashing of the screen giving a progress report on what information has actually been stored. However it is worth pointing out that here something is obviously missing from the programming, because the user can apparently 'dump' files even when the cassette deck is not connected to the 64! There are no prizes for guessing what is missing. Neither is there any form of warning when you wish to recall stored data and the necessary connections have not been made. However, all connections being present and correct, the user should find no trouble in dumping and recalling files.

Having performed the set up correctly, going back to the very first menu displays two more options post and display. In each case it is essential that a printer is connected. If the printer is not ready, the user will be unable to proceed any further because he will be transported back to the

menu. Post is made up of four separate headings, these being daily takings, payments in cash, payments from the bank and journals. One of the functions of the latter option is to record the closing balance of the last financial year.

These balances are made up of the date, the number of the transaction and the account number that is to be debited and credited and a description of the account. Following on from this, the cost of the transaction needs to be entered before the screen output to the printer can commence.

Payments, whether in cash or from the bank account, are recorded in a similar fashion, the only difference being the different address for the two accounts. In either case, the information that needs to be entered is date, transaction number and a description of the transaction. Payment should also be entered along with the VAT content and the net invoice can now be allocated against the nominal account.

Takings can be catered for in several different forms whether it is by credit card, cheque or cash. These takings can be posted to whatever account necessary.

In conclusion, this is a very comprehensive package for the small business. The operations are generally performed very quickly and efficiently. The major disadvantage that will hold this product back is the price because there are systems around that will do as much as this one for less.

# Appropriate printers

The printers produced by Appropriate Technology have been increasing in popularity and the last few months have seen their reputation spread. We decided to take a look at APTEC's printers to find out the reasons for their success.

Appropriate Technology Limited have only been in business for a couple of years. Respect within the computer industry has increased so much so that at the recent Compex Show APTEC shared a stand with the Japanese company Ricoh. Despite their often quoted 'superiority' in technology over the West, the Japanese were amazed at the superior quality of the Flowriter range of printers produced by APTEC as were the many visitors to the stand.

The success of APTEC has been founded mainly on the success of the 1600 printer and the continuity of the Flowriter theme. There are currently three printers that make up this range, the heavy duty one being the 1600 which the manufacturers claim is the marathon-quality print-wheel machine designed to meet the rigorous standards set by offices where the printer is seldom idle.

This model has a solid MTBF of 4,500 hours and a test-bed print rate of 60 characters per second. One of the reasons that this is the heavy duty model is the fact that the 1600 weighs 22 kilogrammes. The claim is further justified by the printing features that are standard to the 1600 and non-standard with other makes.

Like all the other printers in the Flowriter range, the 1600 has been tested at APTEC's premises on the 4000 and 2000 series of PET's. The actual printing is controlled by the motherboard which is situated towards the back of the printer. The daisy wheel printer is made of plastic and has a dual set of characters which consists of the full 96 ASCII character set plus 28 additional special characters. The number of characters that can be printed per inch is variable and can be set at 10, 12 and 15 characters per inch, all of which can be printed bi-directionally by the movement of the optimised print head. No



matter whether the paper is fed in manually or by tractor feed, the printer has the capability of printing up to seven copies at a time.

Information can be provided by several

different sources because there is a range of interface connections that are available because the printers are not just compatible with the Commodore range of micro's. There is a choice of Serial, Centronics

# BUSINESS HARDWARE

Parallel and IEEE 488 Standard interfaces. Transmission format is asynchronous seven bit ASCII plus parity bit which is selectable as odd, even or none.

Data is transmitted at the standard baud rates of 300, 1200 and 9600. The protocol required to accept the information is, of course, entirely dependent on that being used by the micro that the printer is working in conjunction with.

As with many other computer controlled printers, there is a memory buffer. The size of this is 8Kbyte, although a 2Kbyte size is available. Printing format is controlled by external commands. Horizontal spacing is determined at either 136 characters per line or 163 characters per line. Under program control, the spacing varies from  $1/120$  of an inch to  $127/120$  of an inch.

Vertically, spacing is set at eight lines per inch although this can be commanded to any value between  $1/48$  and  $127/48$  of an inch.

Printing can be done in red or black and the user can have advanced print enhancements like boldface, underlining and italics. Switching from normal print mode to the graphics capability is quite simple and means that the print head can be regulated down to  $1/120$ th of an inch to produce charts, graphs, diagrams and picture drawing – all of these are standard features on the Flowriter range.

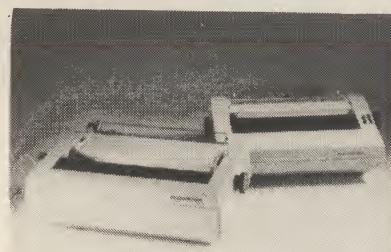
## Compatible

Perhaps the most astonishing feature about this range of printers is the flexibility of the range. The range is compatible with an amazing 28 different micro's that go right through from the Commodore sector of the market straight through to the out and out business computers such as the IBM, Wang and NEC. It follows on from this, that for the Flowriter to be completely successful as a printer for these different micro's, the Flowriter range must be compatible with more than one or two pieces of software.

In fact there is compatibility with 15 applications packages and operating systems including CP/M, Silicon Office, Superfile, SuperCalc, TABS and VisiCalc. It is also a fact that there is compatibility with 15 word processors including EasyWriter, Spellbinder, Wangwriter and WordStar.

Compatibility does not end with packages and operating systems. As well as being fully compatible with Qume, Diablo and Spinwriter as a matter of

course, the range is also Ricoh and Radio Shack compatible so extra wheels and ribbons are easy to get all over the world, and companies other than Commodore have written wordprocessors not only with Flowriter in mind but also around the Flowriter specifications which makes a change from the printer being designed



around the specifications of a package or machine. So far, this article has mentioned only one of the Flowriter printers. There are two more, these being the 1300 and the 1200. The 1300 is very similar to the 1600 apart from two criteria. Whereas the 1600 costs £1635, the 1300 is priced at £1245 (all prices excluding VAT) and the latter printer has a slower speed of 37 characters per second. Like the 1600, there is the same choice of interfaces, advanced print enhancements, buffer and space-skipping logic which is a built-in feature helping the print-head take the sensible route across the page. The Z80 microprocessor looks ahead at the data stream and makes sure that no time is wasted pausing to 'print' tabs, blank lines and spaces.

It is the 1200 that is very much the baby of the family in more ways than one. Lighter than the other two printers and therefore probably the better 'pick-up, plug-in and go' printer, it is this model that is the most recent (it was previewed at the recent IBS show and is to be launched officially in January at the Compec show). This model has been designed to be used by the small business and the very keen home user and has to be priced accordingly, probably for £500 or under which makes it sound very attractive.

However, this comparative low price does mean that certain aspects of the printer's predecessors are not available with this machine. The printing speed is much lower at 20 characters per second, the memory buffer can hold only 2K of data and the interface options are limited to the RS232C and the Centronics. Apart from the price, there is one feature that is on this printer which is not apparent elsewhere in the range. Neither the 1600 or 1300 has a touch sensitive front panel. The 1200 does and very smart it looks too. From the front panel the user can control the pitch, linefeed, power as well as there

being an error indicator. Previous models have an audible error alarm which is activated.

Some small printers often restrict the user to a narrow 80 column paper size and that could lead to problems when it comes to using standard accounting software packages. This is not the case with the 1200 which gives the user a maximum of 165 columns which is probably more than enough to produce good quality tables and financial reports.

There are several accessories for the Flowriter range being offered by APTEC. There is a choice of black, blue or brown multistrike ribbons, each ribbon having a lifespan of 300,000 characters. The ribbon cassettes themselves are easy to install, the holding mechanism being a simple but secure clip. Fabric ribbons are installed by a similar process, but these ribbons (which can be black or black/red) have a greater lifespan of approximately 1,600,000 characters.

## Lasers

There is a print shield to protect the paper whilst printing. The printer hammer flies through a small window in the print shield preventing the ribbon from causing any undue smudging on the paper or platen.

Paper can be fed in using the tractor feed (which can be BDT, Ricoh or Rutishauser) or via sheet feeds. To lessen the noise of any printer, there is also the acoustic hood which comes complete with the options of stand and paper basket. The 333 model encloses the Flowriter with the tractor feed attached whilst the 338H encloses the Flowriter with either tractor feed or sheet feed attached.

Despite the unparalleled success of the Flowriter range, APTEC are not resting on their laurels. As far as APTEC are concerned, the name of the game is improve, adapt and invent. It is this policy which is pushing them far ahead of their rivals. One of the projects the 'backroom boys' are currently evaluating is the use of lasers in the printer. Naturally they were a little reluctant to give away their secrets, but if they do actually come out with a laser printer anywhere near the quality of the Flowriter range, it is bound to revolutionise the computer printing industry and is definitely something to look forward to.

# Turn your Commodore into a full time Profit Centre

## The New SCRIPTA II works all day long~

As a Data Terminal, producing perfect letters and reports from your favourite wordprocessor or impeccable invoices and statements from your trusty business system.

During non-computing periods, SCRIPTA II reverts to the finest electronic typewriter. Depending upon your mood, you can choose any one of 20 Whisper-disk daisy typewheels which are available in 10, 12, 15 and proportional pitch. Numerous fonts can be selected. Classic Gothic or Modern Pica for business, Fine Italic for those intimate little personal messages, Cubic for the chic replies, or Lecturer – the large character – for prompting you during speeches or sermons!

An optional tractor or sheet feeder can be easily fitted or removed at any time to handle all types of documents, forms or letter heads.

SCRIPTA II is a true dual purpose peripheral produced by Europe's largest office equipment supplier – it is not a typewriter modified by some electronic wizard! The product is eligible for an annually renewable on-site Service Contract carried out by the Manufacturer, including all parts and labour. A rare thing these days!

Just plug the SCRIPTA II into the mains and connect your data cable to its input port. Wordcraft, Word-Pro, Silicon Office, The Manager – in fact most software currently available for your Commodore machine, is readily configurable.

Should you require further convincing that SCRIPTA II is the ONLY terminal for your system, contact your Dealer, or write, ring or call Sole U.K. Distributor –

### DATAPLUS

P.S.I., 39/49 Roman Road, Cheltenham, GL51 8QQ,  
Tel: 0242-30030/37373, Telex: 43594



# Hard disks – soft options?

*A fully laden Boeing 747 flying at high speed just three feet above a concrete surface. Until recent technological innovations that was how hard disks were described. Now their unsurpassed capacity for storing information while at the same time keeping it easily accessible have made hard disks increasingly popular for businesses. Here we take a look at those companies who produce hard disks for Commodore machines.*

## I.M.I.

IMI computing have launched a massive campaign in Britain to market the new AP18 multi-user hard disk. Relatively new here, the AP18 has been used successfully in West Germany for the last 12 months and IMI have managed to sell 220 units to businesses plus 13 units on the stands at the huge Frankfurt Computer Show. Despite a formidably busy scheduling visiting and demonstrating the hard disk to various companies, Richard Burroughs brought the disk up to our office for a private demonstration of its abilities; a mean feat as the disk is huge! The AP18 works on the Commodore 8000, 4000 and 700 series.

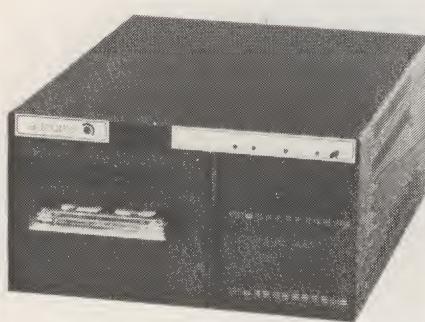
The AP18 has a Winchester memory giving the Commodore Machines a multi-user status, making it ideally suitable as the central mass memory. Up to 12 machines can be connected to the hard disk by means of long cables. The length of these can be increased from 20m to 1000m with a long distance module in the AP18 and the LD 488 unit in the micro. All the connected computers can access the memory simultaneously and can carry out the same or completely different tasks. The 5 1/4 inch disk has either a 18 or 36 Mbyte memory capacity and there are very few companies that would need more than this. An 18 Mbyte memory is equal to about 18 floppy disks and the average sale consisted of the 18 Mbyte and Data Streamer Cartridge. Due to the modern modular structure, the AP18 can be expanded after the first installation and so each system sold can be tailored to suit the customer individual needs.

An advantage of hard disks over the floppy disk drive is that it has a very large capacity memory (doubled with the addition of the 18 Mbytes) and so although the hard disk can be used for the single user it is not usual. Another difference between the two is the incredible speed that information comes up on the screen. Once called up, any file within any of the disk drives can come up on the screen within seconds. Unlike the multiplexer system, the operating system in this hard disk independently manages

and communicates with each other. DOS, a second operating system allows a much faster access time. Searching to match given values, sorting or the building of data bank systems is made easier by Adcomp-DOS, a linear combination offering instructions such as Allocate, Search and also fast copying abilities. The AP18's compatibility with the Commodore Basic 4, the DOS 2.5 and the IEEE488 means that programs written for the CBM 8000 series can be used virtually without modification. In addition 40 relative files can be opened at the same time and each of these is about 4 bytes long. Any data which is put onto these files is sorted and duplicated every 30 seconds and there are two methods of doing this; either at or after the original delivery. If there is a second disk, the information on one drive can be passed onto the second and duplicated. The Data Streamer, the other data protector can copy the 18 Mbyte in 30 minutes onto the DC 300 XL magnetic tape cassette. This is probably the best method for data protection as the security cassette can be kept in a different location.

easy to operate, once people have got over any initial nervousness or suspicion of the system. For some reason, people used to the floppy disk drive are averse to using the hard disk. There is a 64 K memory built into random access to speed up the access and any information can be sent backwards or forwards. Behind the hard disk, there are 12 ports and each one has a triple handshake controller which enables the disk to handle each attached computer separately. One of the disadvantages of the hard disk is that the IEEE is not full and so is not compatible with any of the computers unless the time out is altered although poking the time out takes mere seconds to complete. There are 4 drives on the 18 Mbyte and the layout and format on the VDU screen is exactly like that of the floppy disks which eases any transition from the floppy disk drives to the hard disk. With the 36 Mbyte capacity the number of logical drives increases to 8. Partitioning amongst the disks enables two micros to look at different parts of the disk and it is possible for one computer to talk to drive 1 and think that it is drive 0. Operates can find what computer they are talking to by asking the disk drive the port number and equally can be informed by the computer that it is no longer talking to them.

File and record locking is an important feature of a multi-user system and the use of good software must be stressed. On opening a file that has already been opened the disk informs the user that it is open. If however a program has been locked the user is informed that the file is not available – so any private or confidential programs can be kept safe. Record Locking must be a necessary consideration when planning new programs. An example of where the locking system is useful is in a situation where the stock room and order processing are connected. Two people – A and B, may be both taking orders and both using stock room information. If a customer orders all the available stock of product C, A will register this order on the product C file. If



*The AP18 Multi-user hard disk from IMI Computing: a central mass memory.*

Richard Burroughs set the system up in our office and demonstrated some of its capabilities. The first thing the hard disk does when switched on is to automatically self test and when this is completed, a red light flashes on the control panel. It is

# AT LAST, THE 132 COLUMN PRINTER FOR THE BUSINESS MICRO COMPUTER USER

The MT180 matrix printer is setting the standard in price/performance for the business micro user. The 160 cps gives you high throughput whilst its standard 132 column width is ideal for the latest accounting and spread sheet software.

With the MT180 you can easily use your word processing package. Just one code stream sets the printer to 40 cps correspondence quality and all codes associated with a daisy wheel printer.

#### And all these extra facilities are standard to the MT180

Bar charts and graphics print-out for business reports. Letter heads handled by friction and print-outs by tractor mechanism.

Problem free interfacing — buffered serial and industry standard parallel.

At Mannesmann Tally we just do not believe in the word option.

For the user we have the on-going support only a manufacturer can totally provide.

For the dealer we've set up an operation based entirely on your requirements.

PRESENTING THE MANNESMANN TALLY MT 180  
132 COLUMN 160 cps MATRIX PRINTER

A MULTIFUNCTION PRINTER, WITH WORD PROCESSING, HIGH SPEED DATA PROCESSING AND GRAPHICS CAPABILITIES

#### WORD PROCESSING PACKAGE

AS YOU CAN SEE FROM THIS PARAGRAPH, THE MT 180 OFFERS HIGH QUALITY CORRESPONDENCE PRINT AT 40cps, AUTOMATIC TEXT CENTERING, WHICH LINES UP THE TEXT IN THE MIDDLE OF THE PAGE. THE MT 180 ALSO HAS A CODE STREAM WHICH ALTERS THE CHARACTER SPACING SO THAT THE FAR RIGHT COLUMNS CONTAIN PRINTED CHARACTERS. FOR SAY, INTEGRATED WORD PROCESSING SYSTEM, THE MT 180 RESPONDS TO MOST OF THE SAME CONTROL CODES AS A DAISY WHEEL PRINTER.

THIS LETTER QUALITY MODE ALSO GIVES YOU THE CHOICE OF THREE CHARACTER PITCHES, -

PROPORTIONAL SPACING \*\*\*\*\* MT 180 - THE BEST PRINTER FOR YOUR WORD

12 CHARACTERS PER INCH \*\*\*\*\* MT 180 - THE BEST PRINTER FOR YOUR MICRO

12 CHARACTERS PER INCH \*\*\*\*\* MT 180 - THE BEST PRINTER FOR YOUR MICRO

PLUS A VARIABLE SPACING FEATURE WHICH ALLOWS CHANGES IN CHARACTER SPACING FROM THIS SPACING TO THIS SPACING

#### DATA PROCESSING PRINTING

Here the MT 180 is operating at 160 characters per second with bi-directional printing and short line seeking for fast throughput. To increase your report writing versatility this printer can be programmed to print 6 or 8 lines per inch, plus 12 characters per inch for up to 132 columns, or 12 characters per inch for up to 172 columns, or 16 characters per inch for up to 216 columns, or 32 characters per inch for up to 256 columns.

TO DRESS UP YOUR REPORT OR TO EMPHASISE A POINT YOU CAN CHOOSE:

EXPANDED PRINT AT 5 cpi, EXPANDED PRINT AT 6 cpi,

EXPANDED PRINT AT 8.25 cpi, OR BOLD FACE PRINT AT 10 cpi.

FOR SCIENTIFIC REPORTS YOU CAN DO SUPERSCRIPT (e<sup>n</sup>c<sup>2</sup>) AND SUBSCRIPTS (h<sub>2</sub>O)

TO SIMPLIFY YOUR FORMATTING YOU CAN PROGRAM UP TO 16 VERTICAL AND 16 HORIZONTAL TABS, SET LEFT AND RIGHT MARGINS AND FORM LENGTH.

#### GRAPHICS

For that picture worth 1000 words the MT 180 also comes standard with DOT ADDRESSABLE GRAPHICS at 50 and 100 dots per inch horizontally, and 64 dots per inch vertically. Print pie charts, graphs or any other image you require. For further information, please contact -

MANNESMANN TALLY LTD.

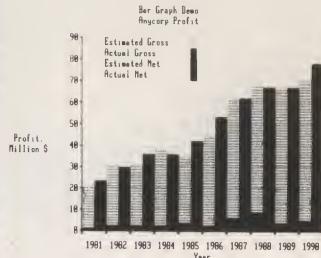
PHONE (0734) 788711

WOKINGHAM,

TELEX 847028

RG11 2QT

TELETYPE 74000000 TALLY MANNESMANN TALLY MANNESMANN TALLY MANNESMANN TALLY



This is a demonstration of the capability of the

display scientific and mathematical notation

$\frac{d^2x}{dt^2} = \frac{d^2x}{dt} \cdot \frac{dt}{dt}$  C<sub>1</sub>, H<sub>1</sub>, N<sub>2</sub>

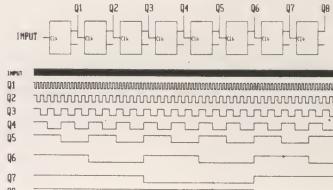
$f(x) = \frac{1}{2} - \frac{1}{n} \sin \frac{\pi x}{L}$  n odd

$U = \frac{1}{3} \sin(R_1 + R_2 + R_3, \theta)$  9 5 3

$\frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} = \frac{1}{8}$  det 7 6 4 = 125

This demonstration shows the circuit diagram for an

eight bit counter with the timing diagram shown below



## THE MT180 FROM MANNESMANN TALLY



**MANNESMANN  
TALLY**

Molly Millars Lane, Wokingham, Berkshire RG11 2QT  
Tel: (0734) 791868 Telex: 847028



Note to microcomputer dealers — if you would like to handle these products then ring Geoff Thomas or Terry Bell on the M-T Direct lines — Wokingham (0734) 791619 and 791533.

FULLY  
COMMODORE  
COMPATIBLE

# PERIPHERALS

another customer then orders product C, B will not be able to access onto the file until A has finished with it. This of course stops B selling the customer something that has sold out.

The AP18 could form the basis of a powerful data processing and information system for distribution, manufacturing and research centres. There are numerous applications with which it could be used, for instance a secretarial pool where they can all use the Wordcraft word processing disk. Or perhaps within a big organisation where there are several different departments - accounting, word processing, stock control, order processing, sales which could be connected to a central common information bank. This would be extremely advantageous as effective communication within a large organisation is often difficult and the hard disk would eradicate any communication problems. The printer options are quite flexible. A central printer can be connected to an IEEE 488 output for use by all the micros, which would reduce printer costs. However it is possible with a few alterations to attach floppy disk drives and printers to each individual computer.

These disks are not yet on the dealers shelves and at present, IMI are really assessing the potential market possibilities here. IMI are going round to everyone that might be interested and are also relying on the dealers to give potential buyers advice. They have had a good response from some of the Businesses approached; Machsize have purchased one for the interfacing used at the Rolls Royce process Control and Sony UK have a floppy version for their data transfer. Richard Burroughs stressed the import-

ance of good software and at present IMI are visiting various software houses to try and procure quality software. Wordcraft who are at present developing an improved Word Processing disk will be supporting and commanding this hard disk to their customers and Bristol Software will also be developing suitable software for the AP18. In West Germany they have been using multi-user software for the last few months - an integrated Information Business System (IIBS) written by SM software.

There are not many hard disks being made in Britain at the moment which are suitable for Commodore. Commodore themselves are having a lot of problems with their hard disks - the 9090 and 9060 and the production of these has come to a temporary halt. In America, the larger companies recognised the gap for multi-user software and so developed the hard disk. Commodore could not offer any competition and in fact have endorsed the AP18, circulating its details to all their dealers and recommending it. The AP18 can be used with their relatively inexpensive computer systems and opens new doors for Commodore dealers. The most advanced technology has been used in making this machine and as a result of the care and expertise, the AP18 is extremely reliable and efficient. It is unfortunate for Britain that about the only British component of the hard disk Richard Burroughs brought in was Richard Burroughs!

The inner mechanism of most hard disks is extremely fragile and the head which reads and writes on the disk is never very far from crashing and causing a lot of damage. With the AP18 the disk

heads are crash proof the disk surface is covered in a tough metal alloy which has a special place for the head to crash on if necessary. In fact an AP18 has never been known to crash and Richard Burroughs has put his model through some tough tests including dropping it onto the floor!

At present the AP18 is only compatible with the Commodore, but IMI are hoping to develop it for other models especially the IBM PC in West Germany. The AP18 needs very little service, but an advantage for British buyers is that all maintenance and servicing is carried out in the UK.

Compared to other disk drives, the main advantages of the AP18 are its high quality, reliability and the speed at which data can be accessed. Richard Burroughs thought that the main disadvantages were that the time out bug had to be poked and while calculating free blocks the disk did not like being disturbed and stopped if information was put in. It is expensive, but as Richard Burroughs put it - if you want quality you have to pay for it. A committed 8000 series user would pay that money and in fact it would probably work out less, as it saves providing a disk drive and printer for each computer. IMI have a six month warranty period.

**Multi-user:** 18 Mbyte Hard disk: £5299 + VAT. Additional 18 Mbyte: £1920 + VAT. Tape streamer for AP18: £2291 + VAT. **Single User:** 18 Mbyte Hard disk: £3660 + VAT, with tape streamer: £5586 + VAT. **Company:** IMI Computing Ltd, **Address:** PO Box 216, Witton, Birmingham B6 7BA. **Tel:** 021-356 4848.

## Mator Systems

Mator systems have specialised in the design and development of microprocessor products since 1976. They design products which are used to connect computers, terminals and disks which would otherwise be incompatible. Recently they have produced a hard disk system for the Commodore Pet - the Shark and the Sharkive which is the fast tape back up system, so called because it is the archive for the Shark.

The 5 1/4 inch Shark is an intelligent Winchester disk unit consisting of a hard disk drive with Winchester memory, a power supply and an intelligent INTEL 8085A-based controlled contained in the metal cabinet, typical of hard disks. Also inside is a cooling fan, looms and a IEEE-488 socket. The Data storage capacity can be increased from 10 to 15 Mbytes and this Shark model forms a comple-

ment to other Shark units which extend up to 120 Mbytes in capacity.

The Mator Shark appears identical to the CBM 8050 floppy disk drive to the Commodore Pet because of the way it handles its IEEE-488 interface and in the command set it supports. Since its IEEE device is switch selectable it can be used in any Pet configuration. It is also possible



The 5 1/4 inch Shark from Mator.

to connect more than one Mator Shark in one configuration. It does differ in one major respect - it provides the Pet with two logical drives each with a full 10.5 or 14.5 Mbyte capacity. With this new capacity, entirely new application areas for the Pet are opened up and it can handle vast amounts of data storage; Stock Control, Mailing lists, Personnel Records for example. The performance of the Pet is increased substantially and it can even be as much as 5 times more effective. Other interfaces compatible are the Intel Multibus and the RS232C. The Sharkive is a streaming tape system which uses the standard 300XL quarter inch removable magnetic tape system. Each cartridge has a formatted capacity of around 11 Mbytes of data and the system can hold the entire contents of a 22 Mbyte Mator Shark on two cartridges. To achieve the necessary high transfer of data between units the

# HARDBOX—Hard Disks for Commodore Micro-Computers



## HARD DISK INTERFACE

HARDBOX is the intelligent controller that lets you add a Corvus hard disk drive to your Commodore computer. In fact, you can chain up to 4 hard disk drives of 6, 11 or 20 Megabyte capacities.

Compatible with CBM DOS versions 1 and 2, the HARDBOX operates with existing Commodore programs and appears to the Commodore as a high speed, high capacity floppy drive.

## Multi-User System

Create a multi-user network by adding the Corvus Constellation multiplexer to your hard disk system. With a HARDBOX at each work station, up to 64 users can simultaneously access the same drive.

As a multi-user system, the HARDBOX provides:

- Separate user areas on each hard disk.
- Multi-user work areas for shared programs.
- File and record locking for shared databases.
- Password protection of user areas.
- Access to any user area from any station using the password.

## Video Cassette Backup

The HARDBOX supports the Corvus *Mirror Option*. This provides a high-speed, low cost means of backup, using a commercial video cassette recorder. Backup speeds of 7½ kilobytes per second let you save contents of a 10 MByte drive in less than 20 minutes. Video cassette capacity is approximately 100 Megabytes.

## Hardware Requirements

- Commodore 3000, 4000, or 8000 series computer with BASIC 2 or 4.
- One HARDBOX and PET-IEEE cable per work station.
- Corvus bare drive and ribbon cable.
- Access to a floppy disk or cassette.

Price ..... £495.00



**small systems engineering limited**

2-4 Canfield Place, London NW6 3BT. Telephone: 328 7145 Telex 264538

Distributed in the UK by:

Carfleet Control, Ltd., Cannon House, 2255, Coventry Road, Sheldon, Birmingham B26 3NX. Tel: 021-742 8771.  
Computer Sales and Software Centre, Ltd., 190/192, Cranbrook Road, Ilford, Essex IG1 4LU. Tel: 01-554 3344.

# PERIPHERALS

Sharkive has to be attached directly to the Shark. Each Shark has provision for this connection and can be linked via an extension to the Shark DOS. Transfer of data is accomplished by Direct Memory Access providing a transfer rate of 0.8 Mbytes per second. There is a self test mechanism which enables the user to check if there are any faults developing.

There is a range of integral disk operating systems the Mator DOS, the Commodore Pet DOS 2.5 emulation and track or sector addressing suitable for interfacing to CP/M etc. The Shark's

internal Disk operating system (DOS) includes some of the following facilities; sequential file manipulation, program save and load, direct and memory access facilities, a disk capacity, housekeeping facilities and an automatic Directory search. The speed with which data is transferred from disk to controller to tape and vice versa is fast and the Sharkive is an efficient means of backing up and restoring the data on disk. The combined effect of the Shark and Sharkive is to provide the Pet with a high-speed, high-capacity storage system. It can be

used in the same way as the 8050 disk drive and can take full advantage of the software available for use on the Pet. A full parts and labour warranty is provided with all Mator products and both Shark and the Sharkive are approved by Commodore.

**Cost:** 22 Mbyte Shark £3695 + VAT, 39 Mbyte Shark £4095 + VAT. Sharkive £1895 + VAT. **Company:** Mator Systems Ltd, **Address:** 134-140 Church Road, Hove, Sussex BN3 2DL. **Tel:** 0273 726464.

## Small Systems Engineering

The most recent hard disk from Small Systems is the MW1000 and it is compatible with the Commodore 2000, 3000, 4000, and 8000 series. The initials stand for Mini Winchester and refer to the small size of the drive which weighs 4 kg and is 100mm in height. It also has a relatively small Mbyte capacity compared to some of the other hard disks compatible with Commodore and the three different models available are the 5, 10 and 15 Mbyte systems. The hard disk can run under the CP/M version 2.2 operating system which runs on the X80A processor, and is also compatible with the CBM DOS versions 1 and 2, with the exception of the commands: MEMORY-READ-WRITE-AND-EXECUTE.

For each system there are different configurations available, so that a potential user may purchase only the exact parts of the system that he will need. This could save money as buying the whole system would be an unnecessary expense if some of the functions were not

needed. For instance with the 15 Mbyte system there are three choices of configuration; Choice A has the PET-DOS version 1 and the 15 Mbyte PET-DOS drive, Choice B has either version 1 and the 7.5 Mbyte PET-DOS drive or version 2 and the 3.75 Mbyte CP/M drive and Choice C has version 2 and the 7.5 Mbyte CP/M drive.

On the PET-DOS system there is a 15 Mbyte file capacity and each 15 Mbyte drive can store 4500 files. Each record has a memory of 256 Bytes and each drive can hold as many as 65535 records. At any time 13 files can be kept open and the drive access time is about 40 milliseconds. With the other operating system, the CP/M, the memory of each file is 7.5 Mbytes in each logical drive and 256 files can be kept in any drive. The access time is the same at 40 milliseconds. Among the functions of the CP/M is the file transfer, text editor, the 80800/Z80 assembler, debugging setting the parameters, copying disks, reformatting the hard disk etc. The advantage of using this system is

that a lot of software has been written for it. The floppy disk format is unique and CP/M software on the Commodore MW1000 format is available from Small Systems and MW1000 dealers. It is also possible to transfer other CP/M based computers via the MW1000 serial port using the SEND and READ routines provided.

Two interface ports are available; the IEEE-488 which is a 24 way 'd' connector using the standard IEEE bus transceivers and the RS 232 which is bi-directional and software selectable. The price of this mini Winchester unit is considerably less than some of the other hard disks, and would probably suit a small business with a budget. One that did not need the huge memory capacity available in some of the hard disks compatible with Commodore.

**Cost:** 5 Mbyte £2538; 10 Mbyte £2750; 15 Mbyte £2970. **Company:** Small Systems Engineering Ltd. **Address:** 2-4 Canfield Place, London NW6 3BT. **Tel:** 328 7145.

## Keen Computers

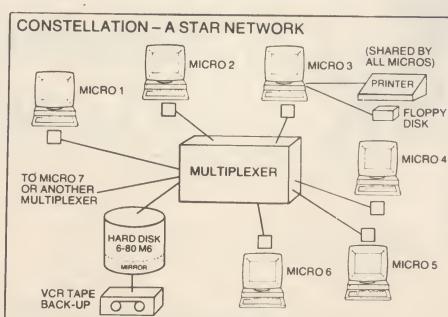
Corvus systems are an integrated set of hard disk units compatible with the Commodore 200, 3000, 4000 and the 8000 series. They incorporate the famous Winchester disk technology with its emphasis on reliability and fast access times. Recently, Corvus have produced the new Corvus "H series" Winchester drives. These boast a greater durability, data integrity and enhanced reliability, qualities which according to a popular US computer magazine, are the most important requirements for a potential user of Winchester.

The new series incorporates a number of recent technological improvements. For instance the traditional soft oxide media which covers the hard disks has been replaced with a hard metal alloy plated on the disk surface. This is less likely to suffer a head crash, one of the most dreaded occurrences of the hard disk

user. This media also gives better recording quality and due to its toughness, there is less likelihood of damage. Another bane of the hard disk is the fragility of its inner assembly rendering them susceptible to damage. A sophisticated shock absorber system changes this and the unit can be carried around without

harming it. The new drive will not overheat due to the finned casting which provides better thermal conductivity and the units require no preventive maintenance.

The single user network can be enlarged to become a network of up to 64 microcomputers using the Corvus Constellation. The Constellation is a multiplexer-based, star pattern network (see diagram) and it can provide shared access for each of the micros of up to 80 Mbytes. The memory capacity of the hard disk varies from 6 to 80 Mbytes. One disadvantage is that all the micros have to use the same printer which would be extremely tiresome if the micros were situated in different locations within a building. Access times on the network are minimised with a through-put transference rate of nearly half a megabit per second. Utilities supplied by Corvus enable multi-user software to be used and



## PERIPHERALS

all the records can be on line in a centralised file for immediate access.

The Commodore can be linked to the Corvus hard disk units and the Constellation network via an IEEE interface which connects to either the "Hardbox" or the "Softbox" intelligent controllers. The hardbox gives CBM DOS versions 1 and 2 compatibility with the 3000, 4000 and the 8000 series. With this, a few commands such as MEMORY-READ-WRITE-AND-EXECUTE are excluded. The softbox enables the CBM 2000, 3000, 4000 and the 8000 series to run under the CP/M version 2.2 operating system and no internal modifications are needed. A hardbox or softbox intelligent controller is needed for each CBM pet linked to the hard disks or the constellation network. The constellation multiplexer is needed if there are more than two micros. The cables linking the micros and peripherals to the central multiplexer can be up to 50 feet in length. Each multiplexer can be linked up to support a total of 64 devices and the Corvus hard disk contains software which controls the network communications. There are three models of the Corvus hard disk available: Model 6, 11 and 20 which have a formatted Mbyte capacity of 6.7, 14 and 21 respectively. The minimum access



time of Model 6 is 43 milliseconds and for the Model 11 and 20 it is 29 milliseconds.

Three months of "microcover" is provided for on-site warranty and there are annual maintenance agreements available. The Corvus disk systems can be compatible with most of the popular business systems.

Cost: 6 Mbyte £1795 + VAT, 11Mbyte £2295 + VAT, 20 Mbyte £3995 + VAT. 2 user system £3200 + VAT, each additional user £450 + VAT. Multiplexer £695 + VAT. Company: Keen Computers Ltd., Address: Minerva House, Spaniel Row, Nottingham NG1 6EP. Tel: 0602 412777

## AP18 MULTI-USER



## HARD DISK SYSTEM

**IMI** Computing Ltd.

P.O. Box 216 Witton  
Birmingham B6 7BA  
Tel. (021) 356 4848 Ext. 2675



**IBM 3740 8" FLOPPY OPTION**

**1-12 USER CAPACITY**

**RELIABLE & STURDY**

**TAPE STREAMER BACKUP**

**EXPANDABLE - 18/36 MBYTE**

**FULL RANGE OF SOFTWARE**

**C commodore**  
COMPUTER

**IMI**

A subsidiary of IMI plc

# CLASSIFIED

## COMMODORE 64 SYNTHESISER

Amaze your family, friends by playing a Piano, Banjo, Flute, Drum, Saxophone, PLUS any other 11 instruments (TOTAL 16).

NOW AVAILABLE FOR CBM 64  
Only £8.99 (VAT P&P inclusive)  
Please send P.O./cheque to:

### TUCRONICS

381 Leeds Road, Bradford BD3 9LY  
West Yorkshire, England.

### VIC20 (3.5K) AND COMMODORE 64 GAMES

- (1) Mastermind/Othello
- (2) Snake/Zombie Island
- (3) Submarine/Bomb Run
- (4) Hangman/Animal

£350 per cassette of two games + 50p p&p

### PUMA SOFTWARE

35 Braemar Avenue, Stourbridge,  
West Midlands DY8 5HU  
Tel: Kingswinford (0384) 279461

## ASTROLOGY

Self-teaching and Accurate Calculation Programs for

Commodore 64  
PET 3000, 4000 and 8000  
and many other machines

Please send large sae to:-

## ASTROCALC

67 Peascroft Road,  
Hemel Hempstead  
Herts. HP3 8ER  
Tel: 0442 51809 (after 8pm)

## A & C SOFTWARE

**TAROT** - See into the future! Ask any question and the Tarot will answer! Full graphics.  
CBM 64 & VIC 20+16K

cassette £4.50

**SIMULATION** - Mathematical model that includes graphic evaluation. Invaluable decision aid.  
VIC 20 (any size) cassette £3.50

**DATA FILE** - Takes the place of any card index. Facilities include: save, load file, full sort, print all/part records, amend, delete records, memory remaining etc.  
VIC 20+16K cassette £4.50

**TEXTPRO** - Powerful word processor. Facilities include: large text buffer, auto centre text, variable tab, insert, amend, delete, copy, move text, word count, right justify etc. Fully menu driven with comprehensive easy to use instructions.  
CBM 64 & VIC 20+16K disk £9.45  
cassette £6.95  
Fully compiled disk (CBM 64 only) £10.75

All programs complete with full documentation and guarantee.  
Prices include VAT, packing and fast delivery by 1st class mail.

Cheque/PO to:

**A & C SOFTWARE**  
51 Ashtree Rd.,  
Tividale,  
Warley,  
W. Midlands  
B69 2HD

Dealer  
enquiries  
welcome

## WORDPOWER (It's nearly famous)

A new machine code wordprocessing program for the CBM PET - £40, inc Manual & P+P

Reviewed in Commodore Computing, May '83

Send A4 SAE for further details.  
(Manual Available Separately £1)

To: Mr K Pretorius  
15 The Vineries, Oakwood,  
LONDON N14 4BH.

## MICROCOMPUTER REPAIRS SERVICES

### VERY FAST

VIC 20, CBM 64, PETs, SPECTRUMS  
- COMMODORE COMPUTERS,  
PRINTERS, FLOPPY DISKS  
Phone SLOUGH (0753) 48785  
MONDAY TO SATURDAY

## FOOTBALL POOLS

Professor Frank George's Football Pools Forecasting system is now available for the:

### COMMODORE 64

as well as: Apple II, Pet, Video Genie, TRS-80, Spectrum, ZX81, BBC 'B', NewBrain, Sharp MZ80K, Sharp MZ80A.

Also available: POOLPERM which calculates perms according to stake and number of matches covered.

Write to: Bureau of Information Science,  
Commerce House, High Street,  
Chalfont St. Giles, Bucks.

## CROFT SOFT

Technical and Educational Software for the Commodore 64

- ELEMENTARY BASIC £10
- 24 Hour Teachpac
- THE LITTLE MOUSE £10
- Reading exercise for 5-7 yr olds
- UNICORN £15
- Over 1400 technical conversions
- THIS OL' HOUSE £20
- Building heat loss
- BABY IT'S COLD OUTSIDE £20
- Insulation investment appraisal

Mail Order only to:

CROFTSOFT,  
4, Folly Lane, North Crawley,  
Buckinghamshire, U.K.

Please add 50p to each order to cover post and packaging.

Name \_\_\_\_\_

Address \_\_\_\_\_

**COMPUTER PROGRAMS** copied (cassette based only). Printed inlay cards supplied if required. Minimum order 10 cassettes. Phone:- M.G. COPIES (MIG RECORDINGS) BURNTWOOD 75375 (24 Hr. Answering Service).

**4040?** Student, in dire straits without one, will collect. Phone: Deri, Rugby (0788) 61933.

**WANTED**, original programs for CBM64 games, business, utilities, adventures, educational, home management. Royalties or cash available. Send your examples to PICKLE SOFTWARE, 4 St. Georges Avenue, Grays, Essex.

**COMMODORE 64** Computer with Disk Drive (1541) For Sale. Excellent Condition with original packing. £275 ono. Ring: 01-647 2250. Evenings and Weekends.

**FOR VIC-20** Stack Expansion Board 27K plus (DAMS) VICMON EPROM: £95. Tel: 07744 52196

**ROCK BOTTOM SOFTWARE** prices. Imported goodies, around 30% off. Education, word processing a speciality, eg. Snooper Troops £23.50, Heswriter £26.90, Microaddition £12.50. Early games £17.50 inclusive VAT p&p. New guaranteed. 14 days delivery. See price lists. Happy 64 Software 84 Linden Avenue, Ruislip, Middx.

**PET 16K 3000 SERIES**, cassette, soundbox, manual and many programs. Excellent condition. Little used still with box, £330. Tel: Basingstoke 23959.

**COMMODORE 64**, 10 programs poss £4.50. Address: 21 Windermere Crescent, Eastbourne, East Sussex BN22 8PR. Tel: 0323 642753.

**COMMODORE PET 8K.** Old roms, integral cassette, small keyboard, dust cover, some tapes including Space Invaders and Asteroids. £200. o.n.o. Contact Simon Reynolds, 21 Bron-yr-Eglwys, Mynydd-Isa, Mold, Clwyd.

**NEW SHOP OPENED.** VIC20/64 Software - Top Quality/Low Prices. Our own brand name (over 30) and other well known companies. Listing service, tapes and other services. Send 75p and S.A.E. or call to:- C. P. White (Services), 52 Northfield Avenue, West Ealing, London W13 9RR. Trade welcome.

**COMMODORE PET 32K** basic 4.0 cassette unit, reset switch, toolkit, games, manual, £375. Tel: 0992 444640.

**CBM 8032 & 4022** Tractor printer, as new. Hardly ever used, offers. Tel: (0908) 674242 (Milton Keynes).

### Here's my classified ad.

Please continue on a separate sheet of paper

I make this ..... words, at ..... per word so I owe you £ .....  
**Name** .....  
**Address** .....  
**Telephone** .....

**Private readers** - advertisements from private readers cost 10p a word.

**Trade advertisements** - cost 20p a word.

**Semi-display** - why not make your advertisement more substantial by choosing the semi-display rate. It is only £5 a single column centimetre.

Send your classified entries to:  
 Classified Department,  
 Commodore Computing International  
 Magazine,  
 167-169 Great Portland Street,  
 London W1N 5FD.  
 Tel: 01-636 6615

## ADVERTISERS DIRECTORY DECEMBER 1983

A Line Computers	86	Interceptor Micros	80	Ortholog	75
Anger Productions	48	Isis Hathor	7	Oxford Computer Systems	67
Audio Computers	2	James Malloy Marketing	127	Phoenix Publishing	22
Boom Software	8	JCL Software	40	Pi-Lok	86
Bubble Bus	46	J Morrison Micros	48	Precision Software	114
Bytewell Ltd	33	John Purdue	52	Quickcount	70
Calco Software	52, 68, 86	John Wiley	18	Ram Electronics	44
Computer Club International	22	Kobra Micromarketing	108	Romik Software	128
Dataplus Ltd	118	Level 9 Computing	44	Simple Software	68
DJAI Systems	92	Llamasoft Software	62	Six Four Supplies Company	12
Electronic Aids	52	Logic 3	21	Small Systems	122
Galactic Software	79	Mannesman Tally	120	Softalk	50
Games Machine	58	Marketing Micro Software	24	Softex	68
Greenwich Instruments	69	Merlin Software	68	Solar Software	48
Home Computer Centre	38	Micro Associates	52	Spectresoft	55
Honeyfold Software	34	Microport	69	Supersoft	15
Huggler Newsbox	110	Micro Power	70	Terminal Software	46
IMI Computing	124	Mondatta Ltd	9	Tunnel Software	67
Intelligent Interfaces	75	Mr Chip	42	Viza Software	78
		Mr Micro	10	Whitby Computers	36

# COLLEEN

*Puts the Commodore 64 and Casiotone MT-11*

## IN PERFECT HARMONY

At last—a Personal Music System that is **ideal** for both the amateur and professional musician alike. At a price you can afford!  
Realise the full potential of the Commodore 64's fabulous sound capabilities with the **magic** of a Casio keyboard.



To Coda ♫

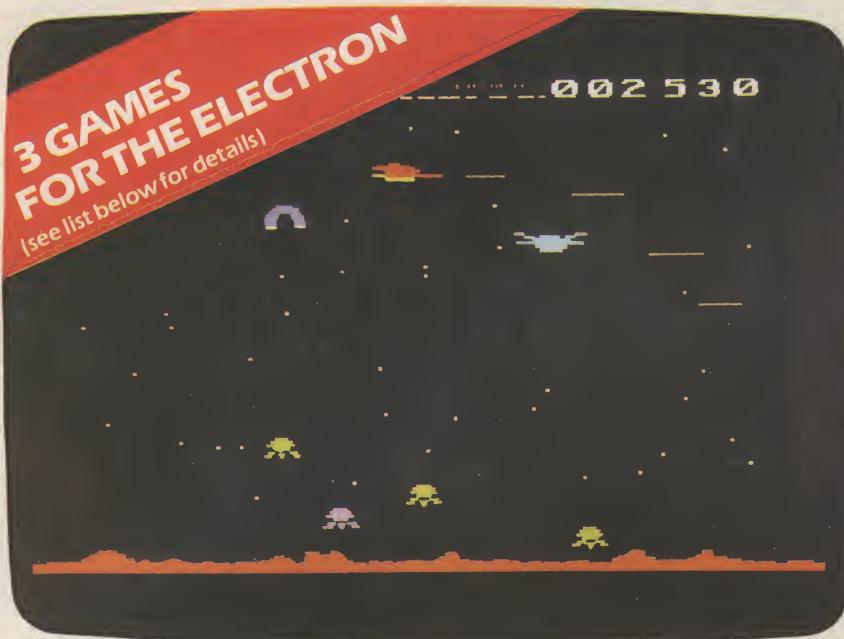
*At the heart of the system is COLLEEN which lets you:-*

- \* Enter notes from the Casiotone keyboard
- \* Store it, play it back, add the melody
- \* Create your own background sounds and rhythm
- \* Print out, save to tape or disk
- \* Display on monitor
- \* Can be used with SYNTHY 64

© CODA

Enquiries to JAMES P MOLLOY (Marketing)  
13 Romayne Close  
Farnborough  
Hants  
Tel (0252) 544218

3 GAMES  
FOR THE ELECTRON  
(see list below for details)



# GAMES THAT ARE HARD TO BEAT

## UNEXPANDED VIC 20

Sea Invasion £4.99  
Mind Twisters £4.99  
Alphoids £5.99  
Insector £5.99  
Power Blaster £5.99  
Shark Attack £5.99  
Space Escort £5.99  
Space Fortress £5.99  
Space Attack £5.99  
Quadrant £5.99  
Atom Smasher £5.99  
Pedes and Mutants £5.99  
Multisound Synthesiser £5.99  
Martian Raider £5.99

## EXPANDED VIC 20 (3K, 8K or 16K)

Caterpillar £5.99  
Time Destroyers £6.99  
Moons of Jupiter £7.99

## ADVENTURES FOR THE VIC 20

Zorgon's Kingdom (8K or 16K) £6.99  
(real time graphic adventure)  
Sword of Hrakel (3K, 8K or 16K) £5.99  
(classic adventure)  
Golden Apple of Zeus (8K or 16K) £4.99  
Animal Magic (16K+) £5.99

## COMMODORE 64

Zappy Zooks £6.99  
Dicky's Diamond £6.99  
Pottit £6.99  
Tombs of Xeios £6.99  
Fools Gold £6.99  
Stellar Triumph £6.99  
Multisound Synthesiser £14.99

## FREE COMPETITIONS

Every action game purchased brings a free entry into the national competition to find the Supreme Champion, and free entry into the annual Romik Grand Master competition with its fantastic prizes.

**FORTH for the 64 only £19.95**

## ELECTRON

**NEW** £6.99  
**NEW** £6.99  
**NEW** £6.99

## BBC

Alien Break-in (Model B only) £6.99  
Birds of Prey (Model A or B) £6.99  
Atom Smasher (Model A or B) £6.99

## 16K or 48K SPECTRUM

Colour Clash £7.99  
Galactic Trooper £5.99  
3D Monster Chase £6.99  
Spectra Smash (plus Breakout) £6.99  
Shark Attack £5.99  
Sub £5.99  
Astroplaner (48K only) £5.99

## ZX 81

Super Nine - 9 1K games £4.99  
Galactic Trooper (16K) £4.99  
Galaxy Jail Break (16K) £4.99  
Bubble Bugs (16K) £4.99  
Bank Robber (16K) £4.99

## DRAGON

Strategic Command £6.99  
Convoy Attack £6.99  
Cyclops £6.99  
Romik Cube £6.99  
White Crystal (graphic adventure) £6.99

## ORIC

Loch Ness Monster £6.99  
See-Saw Scramble £9.99

## ATARI 400 OR 800

Atom Smasher £9.99  
3D Monster Craze £9.99  
Floyd's Bank £9.99  
Power Blaster £9.99

## LYNX



MOONS OF JUPITER for the expanded Vic 20 (any RAM)



ATOM SMASHER for the unexpanded Vic 20



POWER BLASTER for the unexpanded Vic 20



SPACE FORTRESS for the unexpanded Vic 20

## TOP PRICES PAID!

We're always on the lookout for new, top quality machine code arcade games for any machine. If you have what you consider a marketable game, let us know. Nobody pays higher royalties than we do.

**ROMIK SOFTWARE**



Romik Software, 272 Argyll Avenue, Slough SL1 4HE.